

NOV 20 1923

# Railway Age

SECOND HALF OF 1923—No. 25

NEW YORK—NOVEMBER 17, 1923—CHICAGO

SIXTY-EIGHTH YEAR

Published Weekly by Simmons-Boardman Pub. Co., 30 Church St., New York, N. Y. Subscription Price U. S., Canada and Mexico, \$6.00; foreign countries (excepting daily editions), \$8.00, and \$10.00 a year including all dailies; single copies, 25c. Entered as second-class matter January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.



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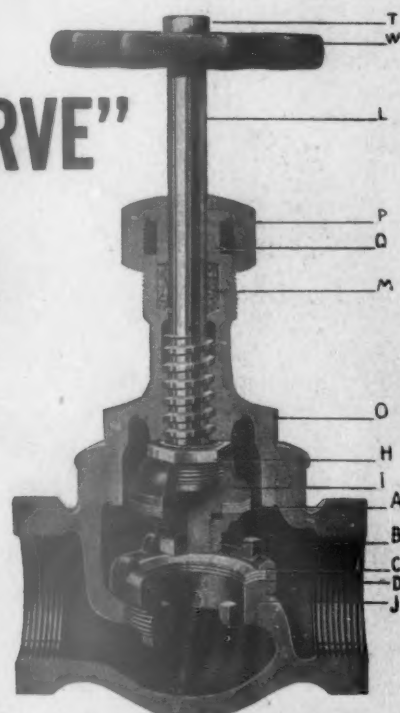
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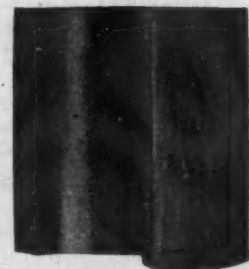
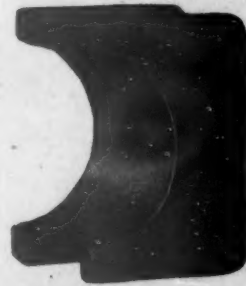
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# EDITORIAL

## Railway Age

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The issue that has arisen over the New York Central's proposal to acquire the Jersey Central and Reading, and to

### Another Consolidation Issue

establish a new trunk line between New York and Chicago via Newberry Junction, Tamanend and Ashtabula bids fair, in many ways, to rival any of the issues that have thus far developed concerning particular railway consolidations. The New York Central's plan has received an uncommon amount of attention, primarily because it has revived the historic rivalry of the three seaports and industrial centers of New York, Philadelphia and Baltimore. Commercial bodies in the New York metropolitan district, including also those in Newark, N. J., have expressed themselves in favor of the New York Central plan. It is, however, the comment of President A. H. Smith of the New York Central that their approval has not been overly decisive and not as strongly indicative as might be desired of New York's wish to retain its present seaport pre-eminence. The Philadelphia interests want an independent Reading-Jersey Central system. They feel that New York Central control will mean detriment to Philadelphia and undue benefit to New York, or that Baltimore & Ohio control will mean a similar result in favor of Baltimore. The Baltimore & Ohio commercial bodies complete the third corner in the discussion in desiring the Reading to be allocated to the Baltimore & Ohio, and they are sure that if the Reading is given to the New York Central, detriment to Baltimore will promptly follow. The Interstate Commerce Commission will have to be the arbitrator in the questions involved. To decide them correctly it will have to go back and study the history of the national post roads and the canals built when each city was striving to hold its own against the other two and in which contest New York finally came out the leader. Did those who formulated the consolidation provisions of the Transportation Act ever expect that the commission would be confronted with an involved and historic question such as this one is proving to be?

An overcharge on freight ought to be settled within from one to ten days, except in a very small percentage of cases. The

### How Quickly Do You Settle an Overcharge?

only excuse that a railroad can have for taking a longer time—say two or three months—to settle such claims is in the bigness of its clerical machine. Within limits this excuse is reasonable. Most railroads are big enough to make necessary a certain degree of uniformity in their operations, and this may necessitate sending some claims to an officer a thousand miles away before agreeing to pay them. But it is important to bear in mind that knowing your methods are reasonable is not the same as convincing the shipper and the consignee that they are reasonable. *They must be convinced*; otherwise there is a continual source of irritation. This irritation may be no worse than a tenth of an ounce of gravel in one's shoes; but it may resemble gravel in that a very little of it may disturb a good deal of otherwise serene thinking. We printed recently an article from a Nebraska newspaper poking fun at railroad claim-department red tape (November 3, page 801). That article, no doubt, was written largely for mere entertainment; but it held a lot of truth. The Central of

Georgia recently told a complaining customer that the road's overcharge debts are usually paid within 60 days (see news column in this issue). That is probably pretty good service, judged by the general "state of the art" of settling freight claims; but is it the best attainable average? An officer of the F. W. Woolworth Company (which sells goods in many cities and by the scores of millions of dollars every year) said at a shippers' conference in New York last week that the traffic department of his concern saved \$200,000 in one year, 1922, by knowing how to collect freight overcharge claims, and he seemed to imply that without a traffic specialist he would have lost that sum. A situation like that is a considerable blot on railroad management. The most significant part of the Woolworth man's statement is, perhaps, the addendum that in 1923 he expected to see his traffic department save 50 per cent more than in 1922.

A short time ago there appeared in these columns an editorial note bearing the same title as the present one. It expressed

### The Progress Is in the Discussion

the view that rapid progress was being made in the matter of railway consolidation, but that the progress was more in the form of discussion and the expression of the views of the public. The developments since the publication of that editorial make it now more timely than ever. One of these developments is the three-cornered discussion among the respective commercial interests of New York, Philadelphia and Baltimore concerning the disposition of the Reading in the consolidation plan. Another is the interesting news that the Eastern Collegiate Debating League will take up the issue in the first series of its winter program. The debates of the first series take place on December 8, and the subject selected is "Resolved, that the best interests of New England will be served by the unified ownership and operation of its railroads." The colleges included in the league are: Amherst, Brown, Columbia, Cornell, Dartmouth, University of Pennsylvania, Wesleyan, Williams and Yale. These debates will deal with New England. A later series might well consider the Reading-Jersey Central issue. The fact that the league has selected a question relating to railway consolidation is evidence that this question is now regarded as a public issue of no mean importance.

In New York a group of literary men have organized what they call the Three-Hours-for-Lunch Club—an informal

### Resourcefulness in Public Relations Work

organization which brings them together at the noon hour to exchange ideas and generally promote good fellowship among themselves. The leader of this club is Christopher Morley, columnist for the New York Evening Post and author of several books. Not long ago Mr. Morley announced through his column in the Evening Post the intention of the club to make a journey to Philadelphia to promote closer relations between the literary men of that city and New York. Last Saturday he published an account of the journey. It appears that when the announcement was made that the club was contemplating the trip, officers of the Central of New Jersey

and the Reading immediately placed a private car at its disposal. The club availed itself of this offer and the railways, furthermore, arranged for representatives of their passenger departments to accompany the writers and point out places of interest in the historic country through which the Reading-Jersey Central route leads. The club's guest of honor for the day was Captain David Bone, a Scotchman, the master of the transatlantic liner *Tuscania* and a writer of sea stories. In honor of this guest two bagpipers had been secured who played a welcome for the club on its arrival at Reading Terminal in Philadelphia and led the small procession of writers down Market street in that city. For the railways, their hospitality to these writers was doubtless an excellent investment from the point of view of advertising alone. It was more than that, however; it was excellent public relations work—for the railways generally as much as for those immediately concerned, and the men who conceived the idea and carried it into execution should be congratulated for their resourcefulness. Mr. Morley's account of the journey to Philadelphia is published in part elsewhere in this issue.

There is not a road in the country upon which transient labor is not employed each year for construction and heavy maintenance work. The amount of

#### How Do You Feed Your Labor?

this labor has been especially large this year because of the large program of construction and maintenance work of all kinds which has been undertaken, the heavy damage from floods in certain areas, etc. As a result, the problem of recruiting these men, feeding them, housing them and holding them has been acute. Some roads have greater difficulty securing this labor than others. This has been due to some extent to such factors as the wages offered, the location of the job and its duration. But it is a significant fact that the ease or difficulty with which some roads have obtained men has been determined very largely by the reputation of those particular roads for feeding them. Some roads have very good reputations and others not so good with transient labor, all because of the experience which such labor has had with bunk house or boarding car facilities. It would prove illuminating to officers confronted with the problem of employing transient labor, or with the problem of handling work on which such labor is employed, to visit employment offices or to mingle with labor contingents en route to jobs, for they will surely be impressed by the influence which the matter of feeding wields in moulding the opinion and governing the conduct of these men. The lesson is plain. It is that the feeding of transient labor should receive the most careful consideration and the personal interest of the officers in charge, not merely with a view to reducing the labor turnover on a particular job, but for the more important reason of establishing a reputation for the railroad which will be favorable to it when it seeks to secure transient labor elsewhere on its lines or at other times. While it may not be the natural inclination of the maintenance or construction officer to dwell much upon such incidents of engineering work as the condition of camps, the cook car and the recreation of labor after working hours, the officer who is alive to his opportunity will at once see the importance of interesting himself in these incidental features, not stopping when he has provided for the purchase of good food and plenty of it, but making it a special point to see that the food is well cooked, made palatable and the boarding cars kept scrupulously clean. It has been said with some truth that an army travels on its stomach. If this is true of an army, it is none the less true of transient labor, and maintenance officers will not only help themselves but render a real service to their railroads if they will keep this uppermost where the question of transient labor is involved. If

the railroad is worth working for it is worthy of a good reputation, and a good reputation with labor is an asset.

The article appearing on another page of this issue under the heading of "I. C. C. Statistics and Operating Efficiency"

#### The Annual Report

is the third article of a series of three written for the *Railway Age* by J. E. Slater, special assistant to the general manager of the New Haven. Mr. Slater in his three articles has analyzed the purposes and uses of the various classes of statistical data which the carriers are required to furnish to the Interstate Commerce Commission. In his first article (*Railway Age* of July 21, 1923, page 115) he discussed the monthly report of earnings and expenses. In his second (*Railway Age* of September 8, 1923, page 427) he covered the O. S. forms on which the carriers report monthly the figures of their operating performance. The third article, which completes the series, deals with the annual report. Those who read the article will have to bear in mind that the annual report referred to is the report to the commission and not the report to the stockholders. Speaking generally, the two reports cover essentially the same ground. The reports to the stockholders, however, vary greatly as between roads. We know of none that gives all the information that is contained in the annual report to the commission and some give a much smaller proportion of that information than do others. That, however, is not the important point to be discussed in connection with Mr. Slater's present article. The important feature is embodied possibly in his belief that the annual report gives a more complete picture than do the O. S. reports and contains information not available in the O. S. reports. The article again points out with no uncertain emphasis the major theme which has been presented in Mr. Slater's two other articles. This is that the whole story is not given in the figures alone. The analyst, particularly if he will essay to compare the operating results of different roads, must be informed of important factors which cannot be put in figures, namely the physical and operating characteristics such as grades and curvature, the proportion of originating, terminating and through traffic, the volume of l.c.l. freight, etc., the effect of which factors as appearing in the statistics, Mr. Slater has pointed out in considerable detail. The emphasis placed upon this feature of railway statistical analysis is the principal factor which should make the three articles an extremely valuable contribution to study of the subject of railway statistics.

## History Will Repeat Itself

SOMEWHAT over a year ago the railways withdrew in large measure from the tie market. As a result production was curtailed and many woodsmen secured other employment. Shortly before the first of the year the roads began to return to the market and by early spring they were competing frantically with each other for the ties they required to meet their season's renewal programs, with the result that prices were forced upward sharply and, even more serious, specifications were waived largely or in part and hundreds of thousands of inferior ties were accepted. Measured in terms of the material obtained per dollar expended, the roads secured far less than they could have secured if they had made their normal purchases in the fall and thereby encouraged orderly production. Furthermore, their need for ties for immediate insertion last spring was such that they were forced to forego the proper period for seasoning which will be reflected in decreased life and add still further to maintenance costs.



Obvious as the lessons from this experience are, there are numerous indications that they are not being heeded, for the demand for ties is again decreasing in many quarters to the extent that production is being discouraged and forces disbanded. One reason for this action on the part of the roads undoubtedly is the desire to bring about a reduction in prices. Another reason which is offered is the fact that the roads have not completed their inventories of stocks on hand after the completion of this year's renewals and they have not, therefore, determined their needs for next year. As far as the first point is concerned, the withdrawal of the roads from the market will inevitably bring about a reduction in prices, for the prices of ties are subject to the same law of supply and demand as those of other commodities. Declining prices naturally result in a decrease in production. But the reverse is also true. When the roads return to the market and the demand increases, prices must be raised to stimulate production and the result always has been, and will undoubtedly continue to be, that the prices under which the majority of the ties are purchased (in these periods of heaviest demand) are greater than would be necessary if the demand were uniform and tie producers were not subjected to the periodic demoralization of their forces.

The objection regarding the lack of knowledge concerning next year's requirements is also of little weight for the well-managed railway is not only closely in touch with the stocks of ties and other materials on hand at all times, but is able to determine the renewals which should be made one or even two years in advance with a reasonable degree of accuracy, the only variation being the restrictions on maintenance of way expenditures which frequently follow reductions in earnings. However, the range between the maximum and minimum number of ties renewed from one year to another is not as large as commonly believed and the roads know that they must enter the market for at least their minimum requirements. If the producers were able to proceed with the production of these minimum requirements, they could maintain their organizations and bring out the ties with the maximum economy because of their ability to maintain their organizations.

As has been pointed out previously in these columns, the railways are almost the sole purchasers of cross ties and they must, therefore, bear practically the entire cost of their production. Any practices which add to this cost must of necessity be paid by the roads, while any economies which will result from a revision of these practices will accrue to their benefit. There is no practice which does more to increase the cost of production of ties than the lack of uniform buying. With the lessons of last spring so recently before them, it is surprising that the roads have not realized more generally the wastefulness of their present practice of postponing their purchases until the last minute. The roads which buy when the demand is small not only save money but they secure a better grade of ties.

## Making the Best Answer to Criticism

THE RAILWAYS are making the best possible answer to the criticisms of them. The answer was put into words in a report regarding what they have done within the last year, and the program of what they intend to do within the next year, which were adopted at the meetings of the American Railway Association and the Association of Railway Executives in New York last week.

The answer may be summed up in the words "public service"—good public service already rendered, better public service to be rendered. Their duty to the public is to serve

it as adequately, efficiently and economically as they can. They have been accused of not using facilities already available as well as practicable. This criticism they have answered by showing that, although in previous years there was a steady increase in operating efficiency, they have in 1923 handled more freight business, and this without serious congestions or car shortage, than they ever handled before.

They have been accused of not making great enough efforts to increase their facilities. They have shown in answer that although the net return earned by them in 1921 and 1922 was relatively the lowest in thirty years, and although in 1923 they are not earning the return to which the Interstate Commerce Commission holds they are entitled, they will, in the present year, make capital expenditures for new equipment and permanent improvements aggregating more than a billion dollars. Where is the capital for these expenditures coming from? It is understood that approximately \$600,000,000 of it still remains to be financed. The railroads have committed themselves to these vast expenditures because the rendering of adequate transportation service requires them to be made, and in reliance upon the good sense of the American people to cause policies of regulation to be followed which will enable them to raise the capital needed to finance them. They are depending upon those who have capital to invest to share their faith. It is not necessary to expatiate upon what the consequences might be if the representatives of the people in Congress should adopt legislation showing that the reliance of the railways upon the good sense of the American people is misplaced.

The managers of the railways have been accused of showing lack of initiative in trying to solve the country's transportation problem. They have shown their initiative both by what they have done this year, and by their program for further increasing efficiency and improving service within the next year. There is no answer to criticism like achievement. There is no better evidence of what men may be expected to do in the future, if given an opportunity, than what they have done already.

The Transportation Act of 1920 imposed upon both the managements of the railways and the government authorities that regulate them certain duties. It required the railways to be honestly, efficiently and economically managed. Their managers can show that duty has been performed. It imposed upon the Interstate Commerce Commission, as the representative of the public, the duty of so regulating the rates of the railways as to enable them to earn a fair return upon a fair valuation. That duty has not been performed, and is not being performed now. In the three years ended on September 1, 1920, the railways earned only two-thirds of the net return to which the Interstate Commerce Commission held they were entitled. In 1923, while handling a record-breaking freight business with unprecedented efficiency, they have not earned the return to which the commission has held they are entitled. The railways are keeping faith with the public. When will the public begin to keep faith with them?

The railways are following the best course possible to get the treatment to which they are entitled. They are still being subjected to criticism by people who do not understand, and by other people who do understand, but who are criticizing them to promote their political ambitions, or accomplishing the ulterior purpose of bringing about government ownership. The railways are making a record and seeking to carry out a constructive program, which are the best answers to the criticisms. They are seeking through many channels to give to the public the facts about what they are doing and trying to do. If they continue to carry out these policies the public will finally understand, and regulation will be fair and constructive. The fight will be long and hard, but it will finally be won, if it continues to be carried on as it is now.

## Socialist Principles in Regulation

GR<sup>EAT</sup> CHANGES have occurred in the objects, methods and spirit of government regulation of railways within the last twenty years. These are best illustrated by a comparison between the principal purpose for which additional federal railway legislation was being advocated about 20 years ago, and the principal purpose for which it is being advocated now. It was being advocated then principally to abolish rebating and other unfair discriminations. It is being advocated now principally to reduce and restrict the net return that the railways may earn. The two purposes are as far apart as the poles. The shift from the one to the other shows how rapidly government regulation is becoming socialistic. The word "socialistic" is used advisedly, as we shall show.

The sole purpose of the Elkins Act of 1903 was to abolish rebating and other forms of unfair discrimination. This was one of the main purposes of the Hepburn Act of 1906. The most important provision of the Hepburn Act was that empowering the Interstate Commerce Commission, when it found a railway rate unreasonable, to substitute for it a reasonable maximum rate. This was the provision upon which President Roosevelt laid most stress and which he was mainly responsible for getting passed. It was intended more to enable the Interstate Commerce Commission to correct unfair discriminations in the rates between communities and shippers than to enable it to reduce rates found to be actually excessive.

In the discussions of rate regulation before the passage of the Hepburn Act little or nothing was said about the net return being earned by the railways being too large, or to the effect that their net return should be used as the main or sole measure of the reasonableness of rates, although at that time their net return was relatively much larger than it has averaged since then, or is now. It was tacitly conceded that if traffic moved freely and the rates were non-discriminatory they were reasonable, even though the railways did earn a large net return by charging them.

Seventeen years have passed since the passing of the Hepburn Act. During this time, and especially during the last seven years, everything that enters into the cost of rendering railway service has greatly increased, except the return paid on the capital in the business, which has declined. The net return earned in 1916 averaged \$2,900,000 a day. It has since been very much less. Thus far in 1923, when the railways have handled a record-breaking freight business, it has been \$300,000 a day less. And yet, although the net return earned by the railways has declined, the amount of it they are being allowed to earn is being criticized, and it is being claimed that rates are too high because they are earning too much net.

In 1916 the wages paid by the railways were less than \$1,500,000,000. In 1923 they will exceed \$3,000,000,000. Why should not the cost of labor be made the principal measure of the reasonableness of rates? Why should anybody regard it as right for the railways to have to pay twice as much in wages as seven years ago, and wrong for them to earn even as much net return as they did then?

Railway fuel, in 1916, cost \$250,000,000. In 1923 it will cost about \$580,000,000. Why should it be regarded as right for the railways to have to pay more than twice as much for fuel as seven years ago, and wrong for them to earn as much net return as they did then? Railway taxes in 1916 were \$157,000,000. In 1923 they will be about \$330,000,000. Why should not the amount of taxes the railways must pay be made the measure of the reasonableness of the rates? How can the state and federal governments justify themselves in more than doubling the taxes of the railways, and at the same time take the position that the railways are not entitled to earn as much net return as they did when taxes were less than half what they are now?

Higher wages than those of 1916 must be paid, it is said,

because the cost of living of railway employees has increased and thereby reduced the value and purchasing power of the money in which their wages are paid. Fuel costs are more mainly because higher wages are paid to miners, and these higher wages are justified upon the same ground as the higher wages of railway employees. The increased taxes likewise are justified upon the ground that the cost of government has increased; and this increase in the cost of government is largely attributed to the decline in the value and purchasing power of the money in which taxes are paid.

The same decline which has occurred in the value of each dollar paid by the railways in wages, for coal and for taxes has occurred in the dollar which they receive in the form of net return. The purchasing power of the railway dollar is only about one-half of what it was in 1916. The total net return earned by the Class I railways in 1916 was \$1,040,000,000. If they were allowed in the year 1923 to earn a net return of \$2,080,000,000, its purchasing power would be no greater than was the purchasing power of the one-half of this amount which was earned in 1916. But, while the decline in the purchasing power of the dollar that the railways pay for labor, fuel, materials and supplies is recognized and justified, no allowance has been made by the Interstate Commerce Commission, in determining the "fair return" on their valuation that the railways may earn, for the depreciation of the dollar in which they receive their net operating income. The net return the commission holds the railways are entitled to earn is in the aggregate but little larger than that which they actually did earn in 1916. Therefore, under the ruling of the commission the net return they may earn has been, in effect, reduced by almost one-half; and now, after the railways have thus, in effect, by the commission's ruling been deprived of one-half of their net operating income, it is proposed to pass legislation to reduce even the amount that the commission holds they are entitled to, upon the ground that it is too great and that, in consequence, the rates they are charging are too high.

The net return earned by the railways this year will be but little more than one-seventh of their total earnings. How can the reasonableness of all the rates charged be measured by the amount of return that about one-seventh of all the rates charged yields upon the value of their properties?

In the court of reason it cannot be. Why, then, is the reasonableness of all the rates being measured by the net return? Because, as a result of socialistic developments and argument, reason has largely been abandoned in the regulation of rates. Socialistic attacks are directed against what is called "capitalism." "Capitalism" is the private ownership and management of property. It is attacked by socialists chiefly upon the ground that it results in the owners of property deriving profits from the property. All profits, socialists claim, are wrongfully taken from labor which, as the argument goes, produces all wealth.

On the socialist theory, any net return derived from the ownership of property is wrong. On the same theory, the larger the profit the greater the wrong and the smaller the profit the smaller the wrong. Railway regulation has become more and more socialistic because it has reduced more and more the part of the earnings of the railways allowed to take the form of net return. Legislation to adopt schemes which would not reduce the amount of the earnings of the railways going directly and indirectly to labor, but which would reduce further the amount of them going to investors, would simply be a more radical application of socialist principles to regulation.

In the court of reason the theory that the reasonableness of all the rates charged by the railways is to be measured mainly, or even solely, by the net return they earn is an absurdity. On the principles of socialism it is sound. How much farther will the nation go in applying socialism in the regulation of railways without realizing what it is doing?



## New Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

### Books and Pamphlets

*Annual Report of the Chief of the Inland and Coastwise Waterways Service. Fiscal Year 1923.* Largely a discussion of waterway-railway relations. Appendix contains operating statistics of waterways, also tonnage and equipment figures. 75 p. Published by Government Printing Office, Washington, D. C.

*Outlines of Economics*, by Richard T. Ely, Thomas S. Adams, Max O. Lorenz and Allyn A. Young. 4th revised edition. Especially Chapter 28: "Transportation Economics." 729 p. Published by the Macmillan Company, New York City.

*The Traffic Dictionary*, edited by George T. Stufflebeam, 2d revised edition. Pocket-size compendium of definitions of traffic terms. 170 p. Published by George T. Stufflebeam, New York.

### Periodical Articles

*Congress and the Railroads.* Includes articles on the problem of railway transport, the work of the Interstate Commerce Commission, rate reduction, valuation, government ownership, and other phases discussed pro and con by congressmen, executives, labor leaders and others. Congressional Digest, October, 1923, whole issue.

*How Paul Shoup Made His Mark*, by B. C. Forbes. Forbes Magazine, October 13, 1923, p. 20-23, 36, 51, 55.

*The Institute Examination Scheme*, by Philip Burr. A discussion of transport examinations of the London Institute of Transport, and of the study and teaching of transport in England and the United States. Journal of the Institute of Transport, November, 1923, p. 13-25.

*The Psychology of the Upper Berth.* The cover announcement is worded: "With the Inventor of Pullman berths in Hades." Psychological Review of Reviews, October, 1923, p. 11-15, 26.

*Rail and Water Transport at New Orleans*, by R. S. Hecht. Mississippi Valley railroads as feeders to this port. Port and Terminal, November, 1923, p. 13-14.

*The Real Remedy for High Freight Rates*, by Thomas Gibson. Economic laws versus political agitation. Forbes, November 10, 1923, p. 151-152, 156, 161, 163.

*A Scheme to Reduce Accidents on Highways*, by E. S. Sinnott. Suggestions for placing "Your Risk" signs at approaches to crossings. Journal of the Institute of Transport, November, 1923, p. 40-41.

*Transportation and the "Spread,"* by Gilbert N. Haugen. A Congressman from Iowa on transportation as a vital element in spread between producer and consumer of farm products. Public Affairs, November, 1923, p. 14.

## New Books

*Proceedings of the Master Boiler Makers' Association 1923.* Edited by the secretary, Harry D. Vought, 26 Cortlandt street, New York. 120 pages, 6 in. by 9 in., bound in cloth

This book contains the proceedings of the Fourteenth Annual Convention of the Master Boiler Makers' Association which was held in Chicago, May 22 to 25, 1923. The reports submitted included Hammer Testing of Staybolts; Maintaining Combustion Chamber Boilers; Finished Plates; Detecting Defective Boiler Sheets; Automatic Stokers; Method of Applying Flues; Life of Superheater Tubes; Steam Leaks; Recommended Practices, and Care of Stationary Boilers.

## Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

## Progressive System for Locomotive Shops Criticized

CLEVELAND, Ohio.

### TO THE EDITOR:

The article entitled Progressive System for Locomotive Shops, by Lawrence Richardson, appearing in the October 27, 1923, issue of the *Railway Age* is interesting, and would be helpful to the mechanical departments of steam railroads if the proposed system could be applied completely in a locomotive repair shop. I believe, however, that there are conditions inherent in any locomotive repair shop which militate against a complete working out of a straight line system as well as the division of repair work into stages, as outlined in this article.

It is a relatively simple matter to apply a straight line system as well as a scheme of staging the work in a manufacturing plant where there is a duplication of units or work. To apply such a system, however, to a locomotive shop where there is not only a great difference in the types of locomotives to be repaired, but different classes of repairs, as well as different kinds of repairs to be done in the different classes, appears to be a very difficult problem. Theoretically the straight line method can be applied, but the system of staging suggested would be seriously disrupted because of the different lengths of time required to remove, repair and reassemble the repaired parts for each locomotive.

It is possible, in any locomotive repair shop, to prepare a definite schedule of work to be done and the time required for each locomotive or group of locomotives. To schedule a complete shop, however, so that it will produce a completely repaired locomotive on every working day is a very different problem. As a matter of fact, in the most efficiently operated locomotive repair shops, it frequently occurs that several locomotives are completed in one day, and possibly several days will elapse before others are completed. In some of the best shops I know of, where they get a production as high as two locomotives per pit per month, repairs are completed sometimes in groups and sometimes singly.

One of the important railroad systems is now planning to increase its production of repaired locomotives by standardizing parts and carrying a sufficient number of duplicates so that when a defective part is removed a new one may replace it immediately. Undoubtedly this system will greatly increase production, but it remains to be seen at what cost. Standardizing parts, as well as the carrying charges on a large number of duplicate parts, will have to be added to the cost of repairs; but it may be that when this is spread over a number of years the average cost will be equal to, or even lower, than that obtained by the methods usually followed.

Referring again to the article and the "Straight Line System," I believe the author has based his comparison of distances traveled by parts on the same machine tool layout for the straight line system as he has for the loop system. For instance, his machine tool layout appears to be fairly well suited to the straight line system he proposes, but it is decidedly not the layout that is used in practically every transverse shop where the loop system of repairs is followed. The

usual layout, where the loop system is used, calls for all stripping and unwheeling to be done at one or two pits, preferably at one end of the erecting aisle. Sometimes, in a very large shop, this is done in the center of the erecting aisle, so as to minimize the lift-over crane travel. In the former case, the lye vats are located just outside the end of the heavy machine aisle, which adjoins the erecting aisle. Parts moving to it, therefore, would move no further than they do in the layout shown in the article, and a considerably less distance when they are again brought to the locomotive for reassembly. In the shop shown the wheel department is too far away from the point where the stripping is done for loop operation. It should be placed immediately in front of the erecting aisle pits where the stripping is done, or where the unwheeling hoist is shown in the layout. The box and rod department should also be located nearby. If this layout is followed it will therefore be seen that the average travel of any part would be one-half the length of the erecting aisle, plus one-half the width of the combined erecting aisle and heavy machine aisle. Thus, in this loop system, the travel of all parts would be a shorter distance than that suggested in the straight line system shop.

Another factor which the author has not taken into account in his comparison is the distance which must be traveled, and the labor required to accomplish it by the locomotive as it passes through the various stages of repairs suggested. I am inclined to agree with him for a shop containing ten or twelve repair kits, that an unwheeling hoist will probably do the work satisfactorily and at a considerably lower first cost than that for a shop equipped with a lift-over crane. In locomotive shops where more than twelve pits are required, or where the locomotive production is more than one per pit per month, a lift-over crane is warranted and will pay for itself in time and labor saved. When the size of the repair plant reaches twenty pits or more, it will also probably be found that the increased flexibility to be obtained will warrant the addition of an outside transfer table.

The value of power in revenue service is such that, while the cost of repairs must be kept down, it is more important to speed up the shop, so as to reduce the time required to make class repairs. It also appears that there will be less confusion if the repaired parts are assembled at the pit where the locomotive has been assigned for repairs, and when they are all there or in sight, to start the reassembly work, than it would be to attempt to assemble the repaired parts of, say, twenty locomotives at one or two points where one or two reassembly gangs are stationed. Parts for a locomotive where the repairs were heavy would, of necessity, have to be stored longer at the reassembly point than those for locomotives undergoing lighter repairs. Considerable storage space for front ends, flues, superheaters, cabs, etc., is always required at the repair pit, and it is a relatively simple proposition to arrange for wheels, rods and boxes in addition.

While all locomotive repair shops are working to the end so to balance their machine departments that repair parts will move back promptly to each locomotive for reassembly, it is impossible to accomplish this 100 per cent without having a great duplication of parts carried in stock. Obviously it takes less time to make some repairs to parts than others, and these parts must be stored somewhere until they are ready to go back on the locomotive, and the assigned pit appears to be the logical point.

From the foregoing, it will be seen that I believe that while the straight line system can be used to a limited extent in locomotive repairs, the most efficient operation and maximum production will be obtained by a combination of it with the loop system. I also believe that, in the case of the locomotive, it will cost less money and require less time to move Mohammed to the mountain than vice versa. In other words, it is easier to truck and handle with cranes the repair parts

than to make very long moves of the locomotive itself. With the lift-over crane, when the locomotive is raised to release the wheels, it is a simple operation to move it down the erecting aisle to the pit where it is assigned for repairs. On the other hand, if the hoist is substituted, and operated in conjunction with a transfer table, considerable time and effort is necessary to remove the locomotive from the hoist to the assigned pit on pony trucks, to say nothing of finally removing it from this pit to the wheeling hoist for reassembly. In the final analysis, I do not believe that the item of first cost of the plant should be the all-controlling factor, but the operating cost of the completed plant, together with its ability to produce the maximum in repairs in the shortest possible time is of more importance.

E. M. HAAS,  
Consulting Engineer.

## Interlocked Highway Crossings

TO THE EDITOR:

With the increase in the number of accidents to trains from collision with motor vehicles at highway crossings does not the highway grade crossing merit something of the same treatment as a grade crossing with another railway?

Judging from a number of photographs, I take it that the crossing gate used by the English railways at the few crossings to be found in that country is quite different from the flimsy arm used in this country. It appears to be a substantial gate which, when not barring movement on the highway, *swings over the railway tracks*. With this arrangement the crossing watchman undoubtedly is constantly on the alert, since any failure to stop highway traffic at the approach of a train would cause the gates to be smashed and bring sure detection of his neglect of duty. The effect of such gates on the crossing watchmen would be the same as that of the smash signals used at drawbridges on the enginemen. They would receive almost unflinching attention.

If there is fear that smashing a gate might damage a locomotive, a fragile wooden arm extending over the tracks when vertical gates were lowered would serve the same purpose in keeping the crossing watchman attentive.

But, with the growing menace of crossing collisions to trains should not the railroads take still further steps to insure safety and *provide signals for their trains interlocked with the highway crossing gates*? There might be some objection to this plan because of the fact that the gates would have to be closed against highway traffic for a longer interval before the arrival of a train than is now the case, in order to give the train a clear signal at a location a half-mile or more away. The result, it might be argued, would be an unwarranted slowing down of highway traffic. It does not seem to me that this would be the case, because by way of compensation for the longer waiting period necessary at an interlocked crossing, the driver of a motor vehicle would have the advantage of not having to slow down at all when the gates did not bar his movement. As long as the gates were open to him the motorist would know that they were closed to trains and protected by adequate signals.

The present flimsy crossing gate which does not effectually bar all entrance to the tracks affords little assurance to the engineman that his train will not hit a motor car at some "protected" crossing. Knowledge of the fallibility of crossing watchmen does not allow the motorist to be sure that the way is clear for him even when crossing gates are up. If a crossing is dangerous enough and busy enough to require protection 24 hours a day, does it not require 100 per cent protection instead of the makeshift variety now afforded, which trusts everything to the fallible human factor?

A. R. P.



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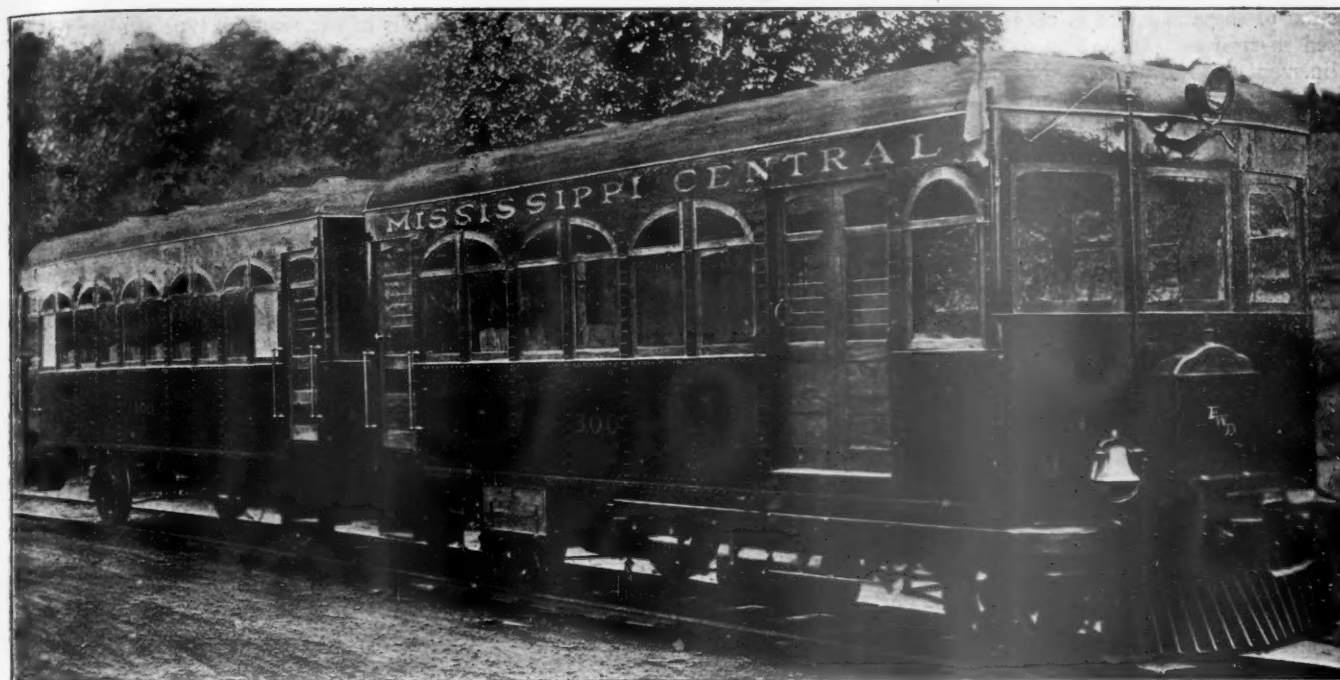
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*Motor-Driven Passenger-Baggage Car and Trailer Built by the Four-Wheel Drive Auto Company*

## Two-Car Motor Train for the Mississippi Central

Chassis, of Four-Wheel Drive Type, and Trailer Provide  
Baggage Space and Seats for 46 Passengers

**T**HE TWO-CAR motor-driven train illustrated was recently built by the Four Wheel Drive Auto Company, Clintonville, Wis., for service on the Mississippi Central. It will operate from Hattiesburg, Miss., to Beaumont, a distance of 27 miles with a ruling grade of one per cent and a maximum curvature of six degrees. The motor unit provides space for baggage and seats for 12 passengers. It weighs complete 11,000 lb. and has a wheelbase length of 15 ft. 5 in. The trailer chassis seats 34 passengers, weighs complete 6,300 lb. and also has a wheelbase length of 15 ft. 5 in. The lengths of the motor unit and trailer, center to center of the couplers, respectively, are 25 ft. 5½ in. and 7 ft. 5 in.

The motor chassis is provided with a six-cylinder 62-hp. motor, having a bore of 5.1 in. and a stroke of 5.5 in. with a piston displacement of 672 cu. in. While the S. A. E. rating of this motor is 62 hp. it develops 94 hp. under brake test. The maximum draw bar pull is 3,780 lb. obtainable with a gear ratio of 29.4 to 1 in low. The maximum speed with this gear ratio is 5.3 miles an hour and the draw bar pull of 3,780 lb. is obtainable at two-thirds of the maximum speed, or about 3.5 miles an hour. With a gear ratio of 15.6 to 1 in low, a draw bar pull of 2,000 lb. is obtainable at about 6.6 miles an hour. At the highest gear ratio of 3.9 to 1 in high a maximum speed of 40 miles an hour is obtained. The maximum draw bar pull obtainable with this gear ratio at 26.7 miles an hour is 500 lb. These figures for draw bar pull are the maximum obtainable and a working safety factor of 20 per cent must be allowed from these figures.

The power is transmitted equally to the four wheels of the driving unit by means of a center differential. The transmission, which is of the jaw clutch type with gears always in mesh, has four speeds forward and as many in reverse. The reverse gear mechanism is mounted on a sub-transmis-

sion which contains a differential and permits the power to be transmitted to the car in either a forward or backward direction.

One of the special features of the F. W. D. train is its spring suspension. The springs are 54 in. long by 2½ in. wide, and are made of heat-treated chrome steel. There are

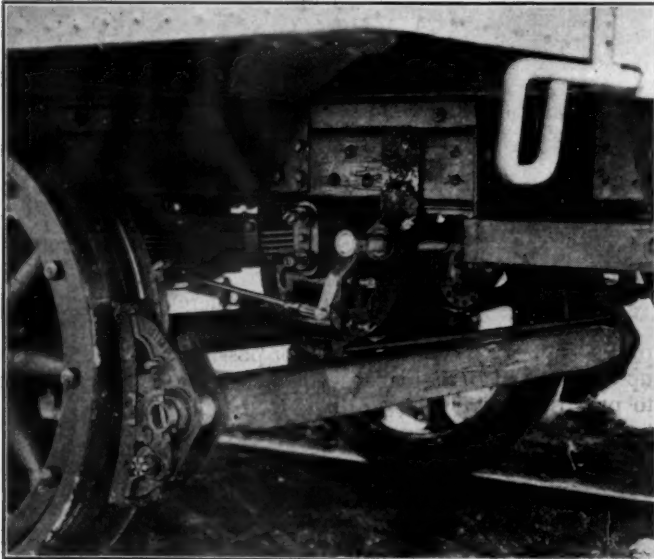


**Interior View Showing Walk-Over Seats and Luggage Racks**

four springs on the power unit and as many on the trailer. These springs are connected with the chassis frame with a double swing shackle, which allows the chassis to swing slightly sideways, thus cushioning the side impacts against the rail and improving the riding qualities of the car. The

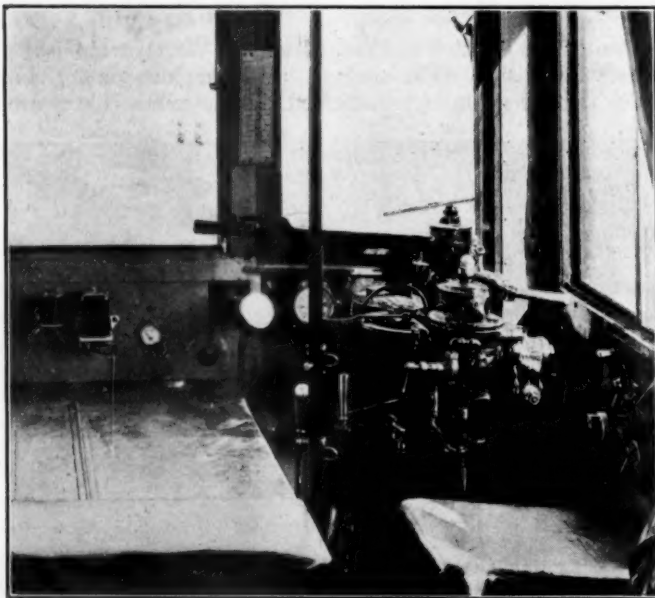
action of these shackles is very similar to that of the bolster used in railroad cars. The axles are held in place and in alinement by radius rods, by the adjustment of which the wheels can be brought into correct alinement. The construction of the spring suspension is clearly shown in one of the illustrations.

Another outstanding feature of the F. W. D. train is the



This Illustration Shows the Brake Beam and Brake Shoe Arrangement and the Double Swing Spring Shackle

brakes. Cast iron brake shoes are used on all four wheels of the power unit, as well as on the trailer, there being one brake shoe for each wheel. A Westinghouse air brake system is provided to operate the brake shoes, air being supplied by a Westinghouse air compressor installed at the rear of the



The Convenient Location of Operating Valves and Handles Is Apparent

transmission. This compressor has a capacity of 10 cu. ft. of air per minute, and is controlled by an automatic governor. An air strainer connected to the intake of the compressor prevents dust and dirt from entering the system. Air from the brake system is used for all necessary safety valves, emergency valves, operator's valve, application valves, sanders,

etc. The brake system is of the two-box type similar to that used in street cars, having a direct air system for service applications and an indirect system for emergencies.

For use on grades and when starting, the train is equipped with sanders. One sand box is placed in the rear of each rear wheel and at the front of each front wheel of the driving unit. The flow of sand from these boxes is governed by an air valve at the driver's seat.

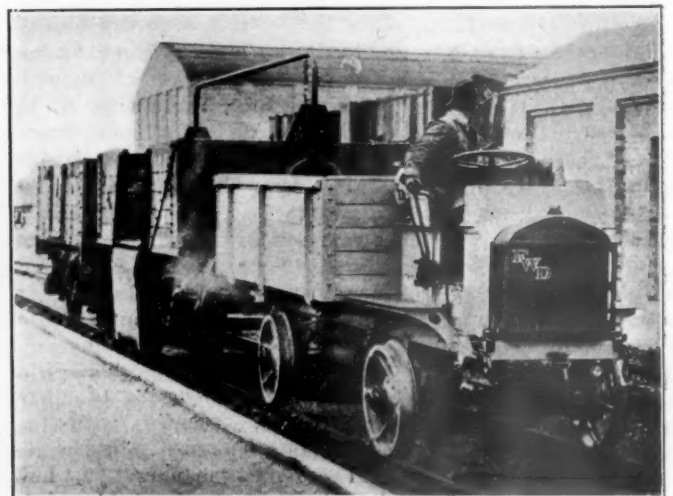
Standard M. C. B. couplers are installed both at the front and the rear of the trailer and power unit. The front coupler of the power unit has a reinforced wood filler block and is bolted rigidly to the front of the chassis frame. The rear coupler is of the spring type. The cars are heated by the exhaust gases from the motor, which are shunted through the heating pipes in the car bodies.

The general dimensions of the passenger-baggage car are as follows: Length overall, 25 ft. 6 in.; width of sheathing, 8 ft. 10 in.; from rail to top of floor, 3 ft. 8 in.; from rail to top of roof, 10 ft. 3½ in.; post spacing, approximately 2 ft. 4 in.; from floor to top of window rest, 2 ft. 4 5/16 in.; from floor to bottom of Gothic sash, 4 ft. 2 7/16 in.; width of door opening in clear, 2 ft.

The following are the general dimensions of the trailer body: Length overall, 29 ft. 9 in.; width of sheathing, 8 ft. 10 in.; from rail to top of floor, 3 ft. 8 in.; from rail to top of roof, 10 ft. 3½ in.; post spacing, 2 ft. 4 in.; from floor to top of window rest, 2 ft. 4 5/16 in.; from floor to bottom of Gothic sash, 4 ft. 2 7/16 in.; width of door opening in clear, 2 ft.

The interiors of the cars are oak grained with the head lining painted white. The sashes are mahogany grained. The outside of the cars are painted in Pullman body color with black roofs, Pullman truck-color platforms and black enameled iron work. The lettering and striping are in imitation gold paint.

LOSS OF VALUE of livestock due to delay occasioned by the shopmen's strike, last year, is the basis of a suit which has been brought by a firm at Phillipsburg, Mo., against the St. Louis-San Francisco. The stock was sent to St. Louis from Phillipsburg. The railroad denies its liability contending that the strike was in defiance of the federal government because the union rejected a decision of the Labor Board. The plaintiff contends that this and other roads made themselves responsible for the strike in rejecting a peace proposal of President Harding.



P. & A.

A Convertible Highway-Railway Motor "Lorry" Used in England



# An Annual \$50,000,000 Saving Possible

"To Do Nothing at All Is Frequently the Worst Mistake  
But It Is a Mistake Which the Management Cannot  
Definitely Fix on Any One Department"

By F. J. Lisman

**B**EFORE THE WAR local passenger service on branch and short lines, and on some of the main lines, was reasonably profitable at an average rate of  $2\frac{1}{2}$  cents per mile. The earnings of passenger trains, including revenue from mail and express, etc., probably averaged \$1.25 per train-mile with costs somewhere under \$1.00 per train-mile. Today in most sections of the country trains which formerly carried an average of probably 50 passengers per train-mile carry barely 20. Allowing for mail and express revenue, these local passenger trains are now earning an average of probably 80 cents per train-mile, while operating costs will average well around \$1.20.

The automobile and motor bus are not only carrying the bulk of passengers which used to travel on these trains, but a great many more. As far as one can tell the local passenger business has left the railroads for good, and the automobile, with the gradual improvement of more and more highways, is going to further reduce passenger revenues. More than one-half the families in the rural districts, among which are included all those who are fairly well-to-do, and who do the most traveling, now own an automobile, and they have acquired the habit of going when and as they please, rather than adjusting their comings and goings to a railroad schedule.

For some years far-sighted men have seen this coming, but very little has really been done by the railroad fraternity to adjust the schedules or service to this changing situation. For about 15 years self-propelled cars for railroad service have been talked of. The McKean car was one of the first but, like most cars of the period of over 15 years ago, it did not meet the situation because it was too heavy per passenger seat.

Furthermore, its machinery was complicated and expensive to maintain. Since then there have been many kinds of gasoline and storage battery cars. Some of them have been a distinct success, as is the case of the Edison electric storage battery car, which has proved its merits on the Canadian National and at several other points; also several gasoline cars, some of them practically homemade.

The *Railway Age* of November 3 contains a very interesting list of self-propelled cars now in operation. This list, however, is far from complete because two of the properties with which the writer is connected have operated self-propelled cars for some time but are not mentioned—that is, the Alabama, Tennessee & Northern and the Tampa & Jacksonville. The Ann Arbor Railroad and the New Orleans, Texas & Mexico, and no doubt many additional lines not included in that table, are operating self-propelled cars.

The article of November 3 is in a way a reflection of the attitude of the railroad companies toward this problem. It contains a good description of the mechanical systems of the various cars, but the most important item—the cost of operation per car mile—is conspicuous by its absence.

The purpose of the self-propelled car is to handle passengers in a safe, dependable and economical manner. Just how the cars are equipped and operated is merely incidental to these three requirements. The president of a company when ordering a car would not care about the mechanical details but would care about the possible saving and certainty of performance. The departments to which the problem is re-

ferred generally reverse this process until in many cases they lose sight of the real object.

The acquisition of a motor car is generally referred to the engineering or motive power department, the officials of which are familiar with steam operations and are fearful lest in tackling something different they may make a serious mistake and be held responsible. They, therefore, endeavor to dodge responsibility by either experimenting *ad infinitum* or by making non-committal reports or passing the responsibility up to the transportation department, which similarly wants to pass the buck. The attitude of the various departments towards the motor car has been very much like the story of a conversation between two workmen in an English manufacturing town:

John: "Who is that man over there?"

Tom: "I don't know; he must be a stranger."

John: "A stranger, is he? Let's heave a brick at 'um."

To do nothing at all is frequently the worst mistake, but it is a mistake which the management cannot definitely fix on any one department.

Motor car manufacturers report that operating officers generally want to make a locomotive out of a self-propelled car; that is, they want the car to pull from one to two extra coaches because there might be a few days in the year when this extra service might be required. Naturally, to meet this exceptional requirement means to double the motive power of the car, which is equivalent to greatly increased weight and cost. This in turn is retarding the sales of motor cars.

There are a number of motor cars which can be operated, depending on their size, at from 25 to 60 cents per train-mile. The cost of fuel is considerably less than the cost of coal for a locomotive. A one or two-car train can be operated on branch lines by two men and on main lines by three men; therefore, at least 50 cents per train-mile can be saved and a somewhat more pleasant service given to the public.

Allowing for the substitution of a self-propelled car for a steam train on a branch line in a daily service of 150 miles, for one or more round trips, at a saving of 50 cents a train-mile, there is a saving of \$22,500 in course of a year of 300 days, or enough to considerably more than pay for the cost of a motor car, or even of the very expensive first cost of an Edison storage battery car, which within certain limitations shows the lowest operating costs.

It is difficult to estimate the total amount of mileage of local steam passenger trains which could be equally well performed by a self-propelled car, but it is probably a conservative guess that this mileage would be somewhere between 400,000 to 500,000 miles a day. Assuming a mileage of 400,000 and saving of only 50 cents per train-mile and 300 days to the year, this would mean a saving of \$60,000,000 per annum. From this sum there must be deducted a substantial amount for depreciation. As the amount so chargeable is not certain, one may arbitrarily charge off during the first year the entire cost of the 2,666 cars required on the above basis, and the purchasers would be ahead of the game at the end of twelve months. This important saving which should have commenced 10 years ago, has been impeded by red tape and lack of initiative.

If the railroad systems want to experiment in order to try

out and develop the best system, they can easily do so by agreeing on the men to do this and the most suitable place. The only reason for so much individual experimenting appears to be that each company has an engineering or motive power department whose duties and *modus operandi* have been sanctioned by custom.

If motor cars for local service had been purchased years ago the car would have been paid for in full out of savings and the companies could in most cases have well afforded to scrap them long before this. A few companies in the meanwhile have had motor cars which, while in some instances not up to the hopes or expectations of their purchasers, have in most all cases paid for themselves before they were scrapped. During the same period many companies have wasted millions which might and should have been saved but for the dread of responsibility.

In most cases in which companies have endeavored to withdraw non-paying passenger trains, they have found much opposition because the public wants to have good service on wintry and rainy days, when the use of the automobile is not pleasant. Railways which are prepared to give a satisfactory motor car service can go before the railroad commissions with good grace and ask for restrictions of competing bus lines. As long as they are using antiquated and worn out steam locomotives and cars for this service, they cannot expect to get full consideration from the public and the commissions.

How many other branches of railroading are there where progress of the art has been impeded by similar conditions of bureaucratic encrustation?

## Freight Car Loading

WASHINGTON, D. C.

**R**EVENUE freight car loading for the week ended November 3 amounted to 1,035,776 cars, a decrease of 39,000 as compared with the preceding week, but an increase of 55,925 as compared with the corresponding week of last year and of 198,200 as compared with 1921. While the seasonal decline is now in progress, the peak for the year having been reached in the week of September 29, when 1,097,274 cars were loaded, it is now apparent that the season of heaviest loading this year has extended over a longer period than usual so that a graphic curve representing the loading shows a much less abrupt rise than is usually shown for the fall months. The drop in the five weeks since the peak week amounts to about 62,000 cars, and the increase in the five weeks ended with September 29 was only about 5,000 cars. The week of November 3 is the eighth consecutive week during which over a million cars were loaded, and with the exception of weeks in which there was a holiday the loading has been above a million cars a week since the week ended May 26. This makes 20 weeks in which over a million cars were loaded.

In the Allegheny district total loading for the week of November 3 was less than that for the corresponding week of last year, due largely to a reduction of over 9,000 cars in coal loading, but all other districts show increases as compared with both 1922 and 1921. All classes of commodities show reductions as compared with the preceding week, the largest decrease being in coal loading. As compared with the corresponding week of last year there were increases in the loading of live stock, forest products, l.c.l. and miscellaneous freight, while as compared with 1921 all classes show increases. Coal loading was less than it has been for several weeks.

With the gradual decrease in loading there has been an increase in the car surplus and a further decrease in the shortage. The average surplus reported for the period ended October 31 was 24,477 cars, including 15,116 box cars and 7,205 coal cars, while the shortages averaged 12,336, including

a total of 3,943 box cars, 3,068 coal cars and 2,333 refrigerator cars.

A new high record in the amount of freight carried was made by the railroads of the United States during the first nine months this year, according to reports compiled by the Bureau of Railway Economics. The net ton miles for that period amounted to 343,796,799,000, an increase of 2.79 per cent as compared with the corresponding period in 1920, when the previous record was made. Compared with the first nine months of 1918, this represents an increase of 4.86 per cent. It also was an increase of 31 per cent as compared with the corresponding period last year when freight traffic was affected by the strikes of both coal miners and railway shopmen.

Freight traffic in the Eastern district during the first nine months this year showed an increase of 39 per cent over the

### REVENUE FREIGHT LOADED

Week ended Saturday, November 3, 1923

Districts	1923	1922	1921
Eastern .....	243,515	242,444	217,433
Allegheny .....	205,419	212,188	171,111
Pocahontas .....	42,725	32,087	33,654
Southern .....	147,835	136,624	124,262
Northwestern .....	155,390	142,350	104,662
Central Western .....	169,681	153,317	123,143
South Western .....	71,211	60,841	63,311
Total western districts .....	396,282	356,508	291,116
Commodities			
Grain and grain products .....	47,823	51,603	40,219
Live Stock .....	43,939	39,391	30,875
Coal .....	179,714	191,083	177,006
Coke .....	11,347	11,419	6,685
Forest products .....	75,509	59,622	51,074
Ore .....	43,197	47,152	11,185
Mdse. L. C. L. ....	252,178	232,049	235,625
Miscellaneous .....	382,069	347,532	284,907
Total .....	1,035,776	979,851	837,576
October 27 .....	1,073,965	999,718	951,384
October 20 .....	1,072,881	989,889	964,811
October 13 .....	1,084,458	969,487	910,529
October 6 .....	1,079,690	953,952	899,681
Cumulative loading for year to date ..	42,655,661	36,199,995	33,699,128

corresponding period last year; in the southern district the increase was more than 27 per cent, and in the western district the increase was nearly 22 per cent.

For the month of September, however, the freight business totaled 39,449,128,000 net ton miles, which was exceeded in September, 1920, by about 3¾ per cent, and in September, 1918, about one-third of 1 per cent. September this year, however, showed an increase of nearly 15 per cent over the same month last year, with the eastern district showing an increase of nearly 19 per cent; the southern district, 14½ per cent, and the western district 19.2 per cent.



P. & A.

Old Wood-Burning Locomotive Used in Celebration of Opening of New S. P. Line in Oregon



# Possibilities of Half Stroke Cut-off Locomotive\*

## Advantages of Compound and Three Cylinder Types Combined with Simplicity of Two Cylinder Type

By W. F. Kiesel, Jr.

Mechanical Engineer, Pennsylvania System

IN PREVAILING practice freight engines are loaded so heavily as to require full stroke, or nearly full stroke operation for relatively long periods. This results in excessive fuel consumption. By apportioning cylinder diameters for 50 per cent cut-off as a maximum, and by providing auxiliary steam in starting, an increase in the expansive use of steam in heavy freight service may be obtained. It involves no mechanical complication whatever; the only additional feature that differentiates this from any other simple engine is the cutting of two slots in the valve bushing. It results in material fuel saving or extended operating range

the locomotive comes to rest with such a crank angle that all of the steam for starting must pass through only one of the auxiliary ports, it will take about half a minute in the worst case to build up pressure equal to boiler pressure in the cylinder. This does not happen with sufficient frequency to be taken into account on road engines.

The functional design features which differ from the ordinary locomotive and which involve little difference in cost and weight, are an increase of steam lap on the valve, a small auxiliary port cut through the valve bushing—one at each end of the steam chest—and a change in the ratio of the lap and lead lever to suit the increased lap.

Based on operation on the road, the average saving of steam in heavy service is at least 20 per cent. If an 80 per cent boiler is used, the coal saving should also be 20 per cent, but with a 100 per cent boiler the coal saving will be greater.

The increase of reciprocating weights, which is the only factor of a negative nature that need be considered, will be closely proportional to the increase of piston pressure. The revolving weights for the main wheels will also be increased, since the back end of the main rods and the main crank pins must withstand the increased piston pressure. The side rods, being designed to slip the drivers, require no modification as the weight on drivers need be no greater. These weight increases amount to about 1½ per cent of the total weight of a heavy Mikado locomotive.

If the increased piston pressure is obtained by increasing the boiler pressure, the weight of the boiler will be increased by an equal amount. To keep the same weight of locomotive, there will have to be a reduction of 1½ per cent if the pressure is not increased, or of 2¼ per cent when the pressure is increased, which will necessarily have to be taken from the size of the boiler. A reduction of 10 per cent in heating surface and the other features governed thereby, will fully meet this requirement.

From experience with simple engines, we know that the lowest water rates obtain between 20 per cent and 50 per cent cut-off. We also know that for starting, a cut-off of at least 80 per cent should be available. Train resistance, which the power of the locomotive must overcome, is large for starting, but drops quickly with increase of speed up to about 2½ miles an hour, and then gradually increases with increasing speed. The auxiliary port permits a cut-off of 80 per cent, but being restricted in size, its effect begins to diminish immediately after starting and to a large extent is neutralized by wire-drawing at about 2½ miles an hour.

The formula for the pulling power of a locomotive consists of a coefficient representing the per cent of boiler pressure  $P$  available as mean effective pressure, which may be represented by the letter  $C$  and the engine constant  $PD^2L \div W$ , which may be represented by the letter  $V$ . The coefficient  $C$  is governed by the expansion ratio  $E$  and when drawbar pull for starting is involved, it is customary to use 90 per cent of the value that would obtain for theoretical calculations, based on the work done in the cylinders. For simplification  $P$  will represent gage pressure and not absolute pressure in this discussion. Drop in pressure, effect of cylinder clearance and back pressure will

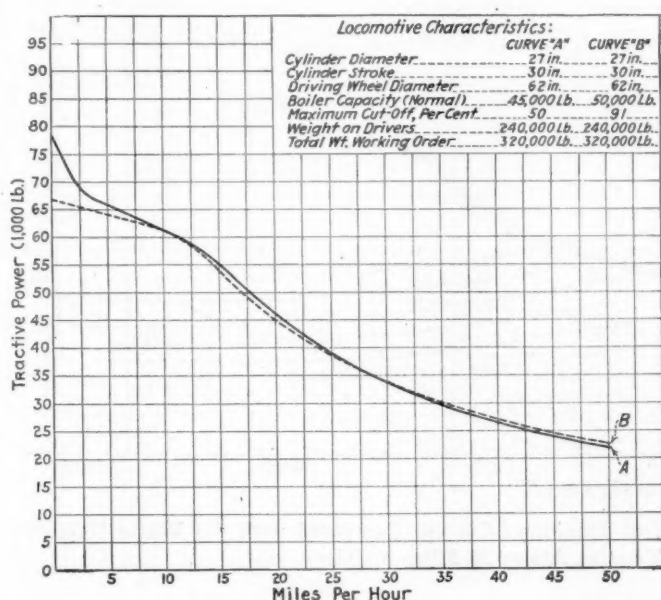


Fig. 1—A Comparison of the Tractive Force Produced by Locomotives, One with Full Stroke and the Other with Fifty Per Cent Maximum Cut-Off

with respect to fuel and water, without sacrifice of starting power or acceleration.

The 50 per cent cut-off locomotive may be defined as one which, in expansion ratio, approximates the compound locomotive, in uniformity of torque practically equals the three-cylinder locomotive, and in simplicity of parts is the same as an ordinary two-cylinder locomotive. The advantages which it provides are materially lower water rates and hence lower coal rates per indicated horsepower. The maintenance cost will be no greater; in fact, it may be slightly less on account of more uniform torque.

Since for certain advantages in any mechanism, it is usually found that there are certain features not so good as in the mechanism replaced, it is natural to inquire what is sacrificed. The piston pressure will have to be at least 25 per cent greater than for a locomotive with 90 per cent cut-off, which involves an increase in weight of reciprocating parts and counter-balance. This cannot be avoided. When

\*From a paper read before the New York Railroad Club, November 16, 1923.

not be included. This procedure will not affect the results materially, since we are dealing with comparisons. These comparisons shall cover locomotives of the same type, weight and power, which will permit ignoring engine resistance, and base power comparisons on cylinder work only.

The formula for tractive force referred to above is  $T = CY$ . The value of  $C$  for the drawbar pull of a simple locomotive in starting is universally taken as .85. For tractive force, based on work in the cylinders (not at the

drawbar)  $C = \frac{2}{E + 1}$ . For a cut-off of 90 per cent,  $E = 1.111$ , whence  $C = .947$ . Similarly, for cut-off of 80 per cent,  $C = .889$ , and for 50 per cent,  $C = .667$ .

The increase of 25 per cent in the value of  $Y$  for the 50 per cent cut-off locomotive may be obtained either by increased cylinder dimensions, or by increased pressure, or by both.

The following assumptions are based on data, which is indicative, but not conclusive: For a locomotive with 90 per cent cut-off,  $C$  is .947 for starting, and at about 12½ miles per hour it is .85. For the 50 per cent cut-off locomotive, it

would permit making the boiler 30 per cent less in value than that of the ordinary locomotive. Since on the equal locomotive weight basis it need only be 10 per cent less the excess boiler, for slow freight full-gear operation, it will produce a coal saving greater in per cent than the water saving.

The water saving indicates that the 50 per cent cut-off locomotive working in full gear can go 44 per cent further before it must stop to take on water. From the tests of the Decapod 50 per cent cut-off locomotive, the formula developed for the ratio of the water rate to the coal rate is  $W \div C = 10.622 - .000104125W$ . This formula will answer for the comparison we wish to make, because the coefficient of the second term varies inversely as the value of the heating surface. The comparative formulæ would then be for the ordinary locomotive,  $W \div C = 10.622 - .000104125W$ , and for the 50 per cent cut-off locomotive,  $W \div C = 10.622 - .0001157W$ .

If  $W = 50,000$  for the ordinary locomotive and 30.6 per cent less, or 34,700 for the 50 per cent cut-off locomotive,  $W \div C$  for the former is 5.42 and 6.61 for the latter, indicating a coal consumption for the latter of 57 per cent of

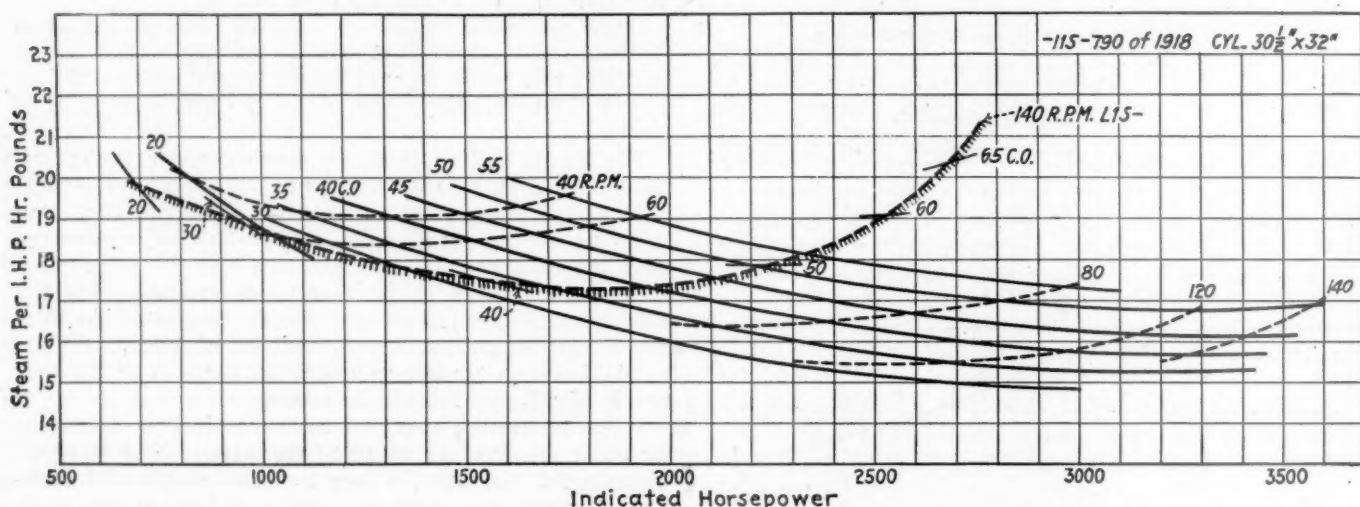


Fig. 2—Water Rates of a Decapod Locomotive with Fifty Per Cent Maximum Cut-Off Compared with the Water Rate of a Mikado Locomotive of the Ordinary Type at About 26 Miles an Hour

is .889 for starting, .80 at 2½ miles per hour, and .667 at about 12½ miles per hour.

To clearly show the difference between the two principles, in concrete form, let us assume the design of a Mikado locomotive to weigh 320,000 lb. in working order, which will have 90 per cent cut-off, 27-in. by 30-in. cylinders, 200 lb. boiler pressure and a maximum evaporation of 50,000 lb. of water per hour.

From formulations given by Professor Arthur J. Wood of Pennsylvania State College, in his book entitled Locomotive Operation and Train Control, the calculated formula for tractive force when worked to full boiler capacity for this locomotive is  $T = 1,356,486 \div (10.121 + V)$ , in which  $V$  = speed in miles per hour. The corresponding 50 per cent cut-off locomotive of equal weight would have 250 lb. boiler pressure, and a maximum evaporation of 45,000 lb. of water per hour. Its calculated formula for tractive force would be  $T = 1,261,440 \div (7.451 + V)$ .

Fig. 1 shows these tractive effort curves for comparison. The transition curve connecting the line for less than boiler capacity with the full boiler capacity line is empirical.

For full gear operation, when hauling heavy loads, it is readily seen that the relative steam consumption of the 50 per cent cut-off locomotive is  $1.25 \times .50 \div 90$ , or .694, a saving of 30.6 per cent of steam. For such operation, this

that of the former, or a saving of 43 per cent, or an increased radius of operation, before taking on coal of 75 per cent. This is the extreme economy, which cannot be realized as an average in any service, except possibly in shifting service.

Let us now investigate the water and coal saving, when both locomotives are working to full capacity at 20 miles per hour. For this speed, the formulæ for tractive force give 45,034 lb. for the ordinary locomotive and 45,952 lb. for the 50 per cent cut-off locomotive, which, therefore, furnishes slightly more power with 10 per cent less steam and coal. By placing the values for  $T$  for the two locomotives equal to each other in the formulæ for tractive force and solving for  $V$ , it will be found that the 50 per cent locomotive with a 90 per cent boiler will furnish more power for all speeds up to 28.46 miles per hour, at which speed they are equal in power, but the former uses 10 per cent less fuel and water.

#### Torque

The torque for the 50 per cent cut-off locomotive is practically as uniform as that of a three-cylinder locomotive with crank axle. A careful analysis of the ratio of maximum to minimum tangential pressure for a three-cylinder and a two-cylinder locomotive, both with 50 per cent cut-off, resulted in a ratio of 126¼ per cent for the former and 126⅔ per cent



for the latter. Another analysis for the same ratio for two-cylinder simple locomotives, one with 90 per cent cut-off, and the other with 50 per cent cut-off, and main rods  $7\frac{1}{2}$  times the length of the crank arm, resulted in a ratio of 158 per cent for the former and 131 per cent for the latter. No hard and fast rules can be formulated on account of variations in main rod and crank lengths, but from studies thus far concluded, the indications are that the ratio of maximum to minimum tangential pressure is at least 20 per cent greater at 90 per cent cut-off than at 50 per cent cut-off. At speed, for earlier cut-off points, the uniformity of torque depends mainly on careful arrangement of the valve events, based on the weight of reciprocating parts.

Uniformity of torque decreases the possibility of slipping,

Four or five years ago extensive tests were made of a 50 per cent cut-off locomotive on the locomotive test plant at Altoona, Pa., which were described in Pennsylvania Test Department Bulletin No. 31. The locomotive tested was a 2-10-0 type designed to be capable of furnishing 25 per cent more power than the 2-8-2 long cut-off locomotive, with which it was compared. Both locomotives were hand fired, were equipped with Type A superheaters, and had no feedwater heaters. These locomotives may be compared for economy, which is not affected by capacity. The maximum thermal efficiency for the 2-8-2 was 7 per cent and for the 2-10-0 was 8.1 per cent.

In the tests of the 2-8-2, including only four tests above 60 per cent cut-off and none in full gear, the average coal

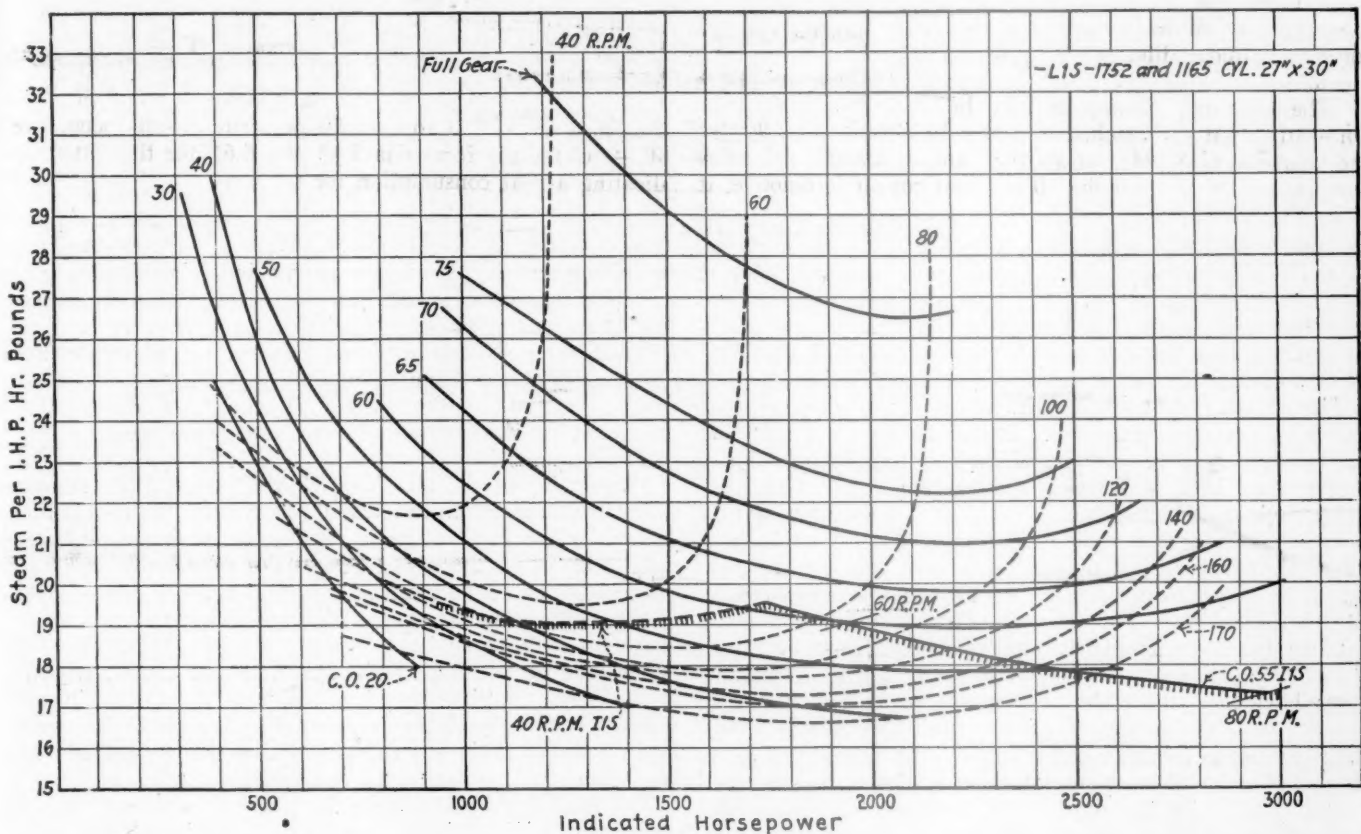


Fig. 3—Water Rates of a Mikado Locomotive of the Full Stroke Cut-Off Type Compared with Those of a Decapod of the Fifty Per Cent Maximum Cut-Off Type at Seven Miles an Hour and at Higher Speeds with Maximum Cut-Off

and tends to decrease the wear and tear of the machinery to some extent. Consequently, the ratio of cylinder tractive effort to weight on drivers may be increased, or with the same ratio, the slipping will be materially decreased.

We may expect an average saving of about 20 per cent in favor of the 50 per cent cut-off locomotive for slow speed and heavy service; a saving of 10 to 15 per cent in fast freight service, and a saving of nearly 10 per cent for medium loads and high speeds.

The increased reciprocating weights must be given due consideration. For slow speed, the effect thereof is of little importance. For high speed, these increased weights are much more important. For high speed passenger service, it may be assumed that the negative effect of the 25 per cent increase of reciprocating weights balances the positive effect of a possible 10 per cent saving in coal and water.

On the other hand, when considering slow speed freight service, the effect of increase in reciprocating weights is negligible and the saving of 20 per cent of coal becomes paramount.

per indicated hp. was 2.83 lb. In the tests of the 2-10-0, of which 30 per cent were at 45 per cent and greater cut-off, the average coal per indicated hp. was 2.57 lb., a decrease of 9.2 per cent, on a basis very unfavorable to the 2-10-0. This shows that, under adverse conditions for the 50 per cent cut-off locomotive, it still shows a material saving over the long cut-off locomotive at its best points of operation.

The advantages in economy of the 50 per cent cut-off locomotive can best be seen from Figs. 2 and 3, copied from Bulletin No. 31, on which the steam rates at 140 r.p.m. have been transferred from Fig. 3 to Fig. 2 and, correspondingly, the 40 r.p.m. line and the full gear cut-off line from Fig. 2 to Fig. 3. The full gear cut-off line is marked "55 per cent cut-off" because it represents a higher mean effective pressure than would be realized at 50 per cent cut-off.

The following remarks relate only to values between 40 r.p.m. (7.38 miles per hour), and 140 r.p.m. (25.83 miles per hour) and tests at water rates not less than 30 per cent of boiler capacity. From Fig. 2 it will be noted that the highest water rate per indicated horsepower is 19.5 lb., which

rate cannot be exceeded with the 50 per cent cut-off locomotive regardless of how the locomotive is operated. From Fig. 3 it will be seen that a water rate per indicated hp. of 31.8 lb. can be reached with the 90 per cent cut-off.

Slow freight locomotives are often operated for extended periods of time in full gear and shifting locomotives are seldom operated otherwise than in full gear. It is customary to provide shifting locomotives with relatively larger grates on this account. From these tests, it is clear that a 50 per cent cut-off shifter should save at least one-third of the water which would be used by a long cut-off shifter. This would increase its radius of operation per unit of water by 50 per cent, would permit reducing the grate area by more than one third, and, if the boiler is not otherwise changed, would increase the water evaporation per pound of coal for the same power by 25 per cent. The coal saving would be more than 45 per cent. At higher speeds and other cut-off points, the saving in water and coal is less.

From these diagrams it is possible to compare any kind of operation and determine the economy. The important feature that they disclose is that the locomotive crew is absolutely prevented from working at uneconomical water and coal rates.

In Fig. 2 the heavy broken line, representing the 2-8-2 locomotive at 140 r.p.m. shows that the best water rate is 17.3 lb. per indicated hp. Correspondingly, the 2-10-0 indicates a minimum rate of 15.3 lb. per indicated hp., or 11.6 per cent less. Hence the tests indicate a saving of water from 11.6 per cent to 38.7 per cent, showing that the estimates in the forefront of this paper are conservative.

The actual coal saving is dependent on the value of the boiler used on the locomotive. It will be apparent that, in nearly every case, an oversize boiler can be utilized. This would result in a coal saving greater in per cent than the water saving. The boiler for the 2-10-0 locomotive tested is an undersize boiler. The minimum coal rate for the tests was 2 lb. per indicated hp.-hr. The coal rate did not exceed 3 lb. per indicated hp.-hr. for all water rates less than 52,000 lb. per hour.

Later locomotives of this type were equipped with the Type E superheater, a feed water heater, and a stoker. Tests have been made, but the report has not been completed. The use of the Type E superheater in the same boiler results in greater heating surface. A number of tests showed a coal rate less than 2 lbs. per indicated hp.-hr., the lowest being 1.79 lb., or 10 per cent less than the best performance of the hand-fired locomotive with the Type A superheater.

## Are We Honest With the Roads?

By E. M. Herr

President, Westinghouse Electric & Manufacturing Company

**I**N SPITE OF HEROIC EFFORTS on the part of the railroad managements, the transportation situation in the United States has become menacing. Our traffic demands double about every 12 years; and if the nation is to be properly served our transportation facilities must be expanded at a corresponding rate. But during the past 15 years, railroad development has, in the words of the late President Harding, been greatly "hampered" by regulations and restrictions, and in consequence, the traffic capacity of our railroads is but little greater than it was in 1910. Efficient operation is moving record-breaking tonnage today, but there is reason to fear that our railroads will prove inadequate to their task in the near future unless effective steps are soon taken.

Transportation is absolutely essential for life as we know it. The whole social and industrial structure of the United

States has been built upon the basis of a free movement of persons and goods. Throttle this movement, and troubles at once begin to multiply. Industry slows down; unemployment increases; fuel and other commodities, including certain food products, become hard to get; prosperity disappears; and want and misery spread.

Such a catastrophe must, of course, be warded off if possible; and as a matter of fact, it is by no means too late to solve our railroad problems, provided only the public realizes the need for constructive action. Unfortunately, however, many people either ignore the danger, or, what is worse, support measures that actually tend to aggravate it.

Perhaps the main reason for this attitude is that the public fails to appreciate what deficient transportation means. When the authorities of a city announce that millions must be spent to provide a sufficient supply of water to meet future requirements, no one questions the necessity for immediate action by competent engineers because they know what a water-famine entails. But because our railroads have always maintained high standards, it is generally taken for granted that the same kind of service can be rendered indefinitely. This is by no means the case. In order to effect the developments and improvements necessary to adequate growth, railroads must be able to obtain ample capital—many hundreds of millions of dollars a year—to construct new lines, electrify, straighten curves, build heavier bridges, buy new locomotives and cars, and modernize terminals. But, due to the present restrictions, the margin between railroad revenues and expenses has become so small that the needed money cannot be readily borrowed. In other words, the credit of the railroads has been injured to such an extent that investors will not freely buy securities.

The responsibility for this state of affairs rests, in the last analysis, on the shoulders of the public. To restrict the railroads seems to have been an avowed object of public policy for the last 15 years. Now, no American familiar with American history can accuse the American people of unfairness. The doctrine of "Justice for all and special privilege for none" is engrained in our national conscience. Time after time, we have ranged ourselves upon what we believed to be the side of righteousness and equity, regardless of the resulting sacrifice. Hence, every step in the regulation of the railroads supported by the public has been taken in good faith—on the assumption that it was for the best interest of the nation as a whole.

But good faith cannot take the place of wisdom. Can a competent opinion as to a method of controlling the railroads be formed without knowledge of the fundamental facts? Is it honest for an uninformed public to take a militant position with reference to the railroads?

If the railroads were corporations operated under the conditions of strictly private business, their success or failure would not be a matter of deep public concern. But the railroads are not in this sense private enterprises—they are the life of the country and on their progress and proper development the prosperity of each and every American depends. Hence, to cripple them through legislation is not merely unethical, it is calamitous and the penalty will be inflicted upon the people themselves.

The vital transportation question is whether or not we shall have adequate traffic facilities for our future requirements. This is the phase of the subject that should be receiving the best attention of both our law-makers and the public and it is here that constructive effort is essential. All else is, from a national standpoint, relatively unimportant.

In an honest and enlightened public opinion lies the security of the nation. When the public comes to understand the railroad problem as it affects the livelihood of each individual, public approval will so support the railroads that the kind of transportation needed for continued growth and prosperity will be insured.



# I. C. C. Statistics and Operating Efficiency

## The Annual Report Provides More Complete Picture Than O. S. Reports and Gives Additional Information

By J. E. Slater

Special Assistant to General Manager, New York, New Haven & Hartford

IN ANALYZING operating statistics it is axiomatic that he who is making the analysis should be familiar with the operating and traffic conditions of the line under consideration. If detailed knowledge is not available based on actual observation, it is important that there should be available to him all of the basic data available which will indicate the fundamental operating and traffic conditions. One of the most serious criticisms which may be directed against railroad operating statistics today is that while they furnish evidence of operating performance, they do not furnish sufficient data which can be used as a background to measure the efficiency of that performance. Furthermore, it must be admitted that this criticism will always be pertinent since it is impracticable to provide complete information covering operating and traffic conditions in regular, current reports. This background of information necessary includes information as to grades, curvature, divisional lines, relative amount of freight and passenger traffic, distribution and density of traffic, balance of traffic, classification of freight, length of haul, amount of freight originating, amount of freight terminating, proportion of overhead or through freight, etc.

The O. S. reports include but few of what may be termed statistics of operating and traffic characteristics. This is one reason that they cannot be used except with great caution in comparing one railroad with another. The information of this character which is included in the O. S. reports or which can be derived from them is as follows:

Proportion of freight and passenger traffic.  
The density of traffic.  
The balance of traffic.  
Average haul.

As an explanation of certain differences in miles per car per day, the O. S. reports show the number of bad order and stored cars. These are the only statistics showing the operating and traffic conditions which the railroad has to contend with. A comparison of this with the items which are not shown indicates the weakness of the O. S. reports in this respect.

### What O. S. Reports Do Not Include

The O. S. reports do not include any information covering the following:

The amount of originating, terminating and overhead traffic.  
The classification of traffic—coal, merchandise, I. C. L., etc.  
The diversity of traffic.  
The amount of local traffic which must be handled in local trains.  
The amount of and performance in yard service.  
The amount of and performance in station service.  
The physical characteristics which affect freight train service.

The annual report of the railroads to the Interstate Commerce Commission is extremely valuable in checking operating efficiency in that it does furnish some of the information which is lacking in the O. S. reports. While these data are at times inconclusive and cannot be entirely relied upon as an indication of operating and traffic characteristics, yet the combination of the information in the annual report (to the I. C. C.) with that of the O. S. reports provides valuable data indicating the operating and traffic problems confronting the management of the railroad or group of railroads under consideration.

The annual report to the Interstate Commerce Commission provides information:

1. As to the classification of tonnage,
2. The amount of tonnage originating on the individual railroad,
3. Some indication of the volume of yard and station work,
4. Some indication of the relative amount of local freight traffic.

It also provides a clearer indication of the relative importance of freight and passenger service as they affect expenses.

### Chief Assets of Annual Report

The chief assets of the annual report for the analyst of operating efficiency are, therefore:

1. It provides a larger amount of information on operating and traffic characteristics than the monthly reports.
2. It includes information as to station, yard and other expenses not covered by the monthly reports.

It will be noted, however, that the annual report still leaves large gaps which should be filled in before the complete picture of the operating and traffic characteristics is obtained. Of these gaps, perhaps the most serious are those covering first, the distribution of traffic, and second, the amount of traffic terminating on or overhead to the particular carrier. It would be extremely helpful in any analysis of operating statistics if, in addition to the volume of originating tonnage, the amount of traffic terminating on or overhead to a railroad was available. The importance of the originating or final terminal expense in connection with the movement of freight has long been realized. The actual measurement of the effect of this on expenses of individual railroads has, however, been impossible on account of the lack of information as to the actual amount of traffic which did terminate or which was through. What is not as generally recognized is that this relationship in the volume of originating, terminating and overhead tonnage is of the greatest importance in connection with the analysis of operating efficiency. Factors of train performance and yard and station performance are all affected because of the essentially local nature of originating or terminating traffic. If, coupled with a large amount of originating or terminating traffic, there is a diversity of traffic over an entire railroad line, the statistics of car and locomotive use are also much affected. The importance of this in connection with the individual units has been pointed out in a previous article.

While it is possible to provide information as to the amount of terminating and through traffic as well as the amount of originating traffic, it will never be possible to obtain statistics indicating the distribution of traffic unless the Interstate Commerce Commission requires the density of traffic by divisions, main line and branch line, etc. Yet, as has been shown in previous articles, it is absolutely essential to know to what extent traffic is distributed over a railroad—whether it is concentrated on main line or is diffused over numerous secondary and branch lines.

### Statistics of Particular Interest

The statistics in the annual report to the I. C. C. which are of particular interest to the operating analyst are:

1. The separation of operating expenses by primary accounts subdivided between passenger and freight services.
2. The separation of man-hours by classes and between straight time, overtime and constructive allowances.
3. The classification of tonnage.
4. The statistics of train, locomotive, car and ton-miles.
5. The statistics of maintenance of way performance.

### Separation of Freight and Passenger Expenses

The separation of operating expenses by primary accounts and between passenger and freight services is one of the most important elements in analyzing the operating efficiency of a railroad. This importance is due:

1. To the fact that it permits separate consideration of these entirely different classes of traffic.
2. To the fact that it covers all phases of operation except the utilization of equipment.

In the past there has been considerable controversy as to the methods of separation. For years, many railroad men contended that such a separation was impractical and some still hold to that view. As a justification for their position, they point out that almost none of the expenses can be directly assigned to one service or the other and that some basis of apportionment must be used for making the separation. They further point out that in the case of certain groups of expenses, notably the maintenance of way expense, it is impossible to make a separation which is not subject to grave objections. Yet, the railroads themselves and all students of railroads are interested in the results which such a separation makes possible. It is certain that if no separation is made, little can be derived in the way of unit figures from our operating expenses. This objection applies particularly in the transportation expense group which is the largest and most important.

If no separation is made and some figures are desired, recourse is usually made to the use of some unit combining passenger and freight traffic, such as the equivalent ton-mile or traffic unit. Dangers in the use of the traffic unit as an accurate measuring stick of unit expenses have already been outlined in these columns. It is only necessary to say that an analysis of the traffic unit shows that except under certain conditions, it will not reflect the unit cost of freight or passenger expenses, nor will it reflect accurately relative expenses of the different classes as between railroads or as between periods on the same railroad. As between the objections to the traffic unit which is a combination of two entirely dissimilar units, and the objections to the separation of expenses between passenger and freight services, there can be but one choice.

### Some of the Complications

This is borne out by the fact that, after all the controversy as to the methods of allocating expenses, the final result covering all expenses will not differ widely as between the various generally accepted bases for such a separation. The only great group of expenses in which there is wide difference of opinion and in which different methods will produce widely dissimilar results is the roadway and track group of maintenance of way expenses. Outside of items which are overhead, such as superintendence, stationery and printing, etc., both maintenance of equipment and transportation expenses can be separated upon bases which indicate in a reasonable degree the relative amount of use. The large groups of expenses, such as station, yard and train expenses can be separated with close accuracy. It is true that the roadway and track group under maintenance of way expenses does provide room for considerable discussion. As between the use of the train-mile or locomotive-mile which assigns a larger proportion of expense to passenger and the gross ton-mile which assigns the largest proportion of expense to freight there is a wide variation. It is generally agreed, however, that neither of these bases is proper since the one does not give sufficient importance to the weight of freight trains nor the other to the speed of passenger trains. Some compromise between the two is reasonable. So far, the fuel basis which does, in some way, measure the relative effect of weight and speed, provides the simplest, most practical and most tangible basis.

Furthermore, much of this controversy is in the nature of

a tempest in the teapot. Unless some particular group of expenses is under consideration, it does not make a great deal of difference in the final result which method is used. On account of the large amount of passenger service on the New Haven, any differences in method particularly affect the New Haven's separation. As an indication of the relatively small effect due to the change in method, there is shown below the statement of operating expenses divided between passenger and freight for a six months' period, the first basis being that of the 1916 method prescribed by the commission and the second the basis now in effect:

General account	On 1916 basis		On present basis	
	Percentage passenger	Chargeable to freight	Percentage passenger	Chargeable to freight
Maintenance of way and structures..	59.1	40.9	51.3	48.7
Maintenance of equipment.....	44.5	55.5	43.3	56.7
Transportation expenses .....	44.0	56.0	42.3	57.7
Total operating expenses.....	47.2	52.8	44.7	55.3

The net result of these changes was a 4 per cent reduction in the expenses chargeable to passenger and a corresponding increase in the amount chargeable to freight.

The separation of expenses by primary accounts and between passenger and freight is particularly important because it provides some information on station and yard expenses and other groups which are not covered by other reports.

This advocacy of the separation of expenses as a measuring stick of operating efficiency should not be taken to mean that these statistics are not subject to the same objection and to the same difficulties as other operating statistics. They also reflect operating handicaps as well as operating efficiency. They also reflect conditions over which the managements have no control. Without some statistics giving background of operation, they cannot be used to indicate the relative operating efficiency of different roads or of the same railroads in different periods. They do, however, provide a better balanced set of statistics than those which cover only certain items of railroad operation. In this case, when all aspects of operation can be given weight, the analyst is not likely to go astray by following one particular line of operation and failing to see the effect of this policy upon other phases.

One of the chief objections to the use of operating expenses in measuring efficiency is that recently most of the changes have been due to changes in rates of pay and prices of fuel and material rather than to changes in operating efficiency. On this account, the man-hours have been recognized as valuable statistics.

### Use of Man-Hour Statistics

Until recently, the use of the man-hour statistics has been rendered difficult on account of the various changes in the classification that have been made from time to time. Furthermore, prior to the classification which was made effective on July 1, 1921, there was no separation as between maintenance of way, maintenance of equipment and transportation departments. The classification which is now in effect is reasonably satisfactory for the purpose of checking operating performance. It provides a separation by departments, between straight time and overtime and gives the amount of constructive allowances and constructive mileage.

The man-hours are particularly useful in that they provide even more detail than the operating expenses. This applies especially to the transportation group. For example, the separation of station employees between the agents, operators, baggagemen, freight house foremen and freight house laborers enables a direct comparison of the changes in the volume of business with the fluctuations in the man-hours of classes which should fluctuate with the volume of traffic. On the other hand, in the operating expenses, these are all combined into one account, "station employees."



The separation in freight train man-hours as between local and through trains is also most helpful. The local trains are almost a fixed expense. On the other hand, the man-hours in through service should follow the trend in traffic much more closely. The man-hour figures, therefore, have the advantage of being unaffected by changes in wage rates, while the segregations into a larger number of classifications than the operating expenses permit a closer check of changes in the volume of traffic with changes in items which should fluctuate with traffic.

On the other hand, the same caution must be used with man-hours as with the other statistics, especially when an attempt is made to compare the results on different railroads. Man-hours and expense as well as train load, car load, miles per car per day and other statistical units, reflect operating disadvantages. For example, the man-hours in station service per ton-mile may be high due to:

1. The large amount of originating or terminating traffic.
2. The large amount of l.c.l. freight.

The man-hours per car mile in yard service may be high due to:

1. The diversity of traffic requiring a large number of intermediate terminal handlings.
2. The large amount of originating and terminating traffic.
3. The short haul.

The man-hours per ton-mile may be high on account of the same factors which prevent a heavy train load. In other words, the advantage of the man-hour figures over the statistics of train load, car load, etc., lies not in the fact that it discounts differences in operating or traffic conditions, but rather in the fact that it furnishes a more complete picture of all phases of operation.

#### Classification of Tonnage by Commodities

The classification of tonnage by commodities with the further separation as between tonnage originating upon a railroad's line and tonnage which is received from connecting carriers is of value not only to the traffic expert but also to the analyst of operating efficiency. This statement furnishes almost indispensable information as to traffic characteristics. It indicates to what extent a railroad is aided by a large volume of traffic which permits of heavy car and train load and to what extent it is handicapped by a large percentage of the expensive l.c.l. tonnage which must invariably be handled in lightly loaded cars. The statement is also of value in showing the amount of originating tonnage because this shows the handicap brought about by the large amount of terminal expense. As has previously been shown, however, the statement is incomplete because it does not show the amount of equally expensive final terminal tonnage or of the relatively inexpensive overhead tonnage.

Another valuable feature of this report is that it shows the number of car loads as well as the number of tons. From this can be obtained the average car loading for various commodities. Unfortunately, it is not possible to show the number of car loads of l.c.l. freight so that this feature can be checked only in the most general way. Many roads have the average tons per car out of their important stations and transfers so that for their own purposes they can follow this information. Such data, however, are not available in the public reports. The particular importance of the average car loading for various commodities is that differences among various railroads in the average car load can be checked to determine to what extent such variations are due to the character of the freight handled. A further benefit of this statement is that in showing the amount of originating tonnage, the extent to which a railroad can control its car load is readily determined. A railroad cannot be criticized for light car loading or commended for heavy car loading when the great bulk of freight is received from connecting lines. The statement of classification of tonnage is, therefore, of considerable value because it furnishes information not other-

wise available as to the character of the freight handled and also valuable material from which deduction can be drawn as to the efficiency of car loading.

#### Statistics of Rail-Line Operation

While most of the other statements in the annual report are made for other than the analysis of operating statistics, one set of figures is given primarily for this use. This is the statement of statistics of rail line operation. These include detail of train, locomotive, car, net ton-miles and passenger-miles and certain units derived by various combinations of these figures. Some of these units are similar to various units on the O. S. reports. These include the number of cars per train, number of tons per train, number of tons per car, locomotives per train, the revenue per ton-mile and per passenger-mile and the average haul per ton and per passenger. Other information not shown in the O. S. report is the separation of the locomotive miles as between principal and helper and the train and yard switching locomotive miles.

Prior to the establishment of the O. S. reports, these statistics furnished the only published information as to operating performance and were exceedingly valuable on that account. With the advent of the O. S. report, their use with respect to the unit statistics of performance was very much decreased because the O. S. reports furnish much more detailed information. For this reason, these statistics are now more valuable in furnishing full detail as to the total volume of business expressed in the various units which can be applied against various operating expenses, man-hours, etc., in order to obtain unit costs. As to the units of train load, car load, cars per train, etc., no comment is necessary. The caution that must be used in the analysis of these units has been pointed out in a previous article in considering similar items on the O. S. reports.

There are one or two features, however, which the O. S. reports do not cover and which deserve consideration. Among these, the most important is the information as to train and yard switching. These figures in total as shown in the report are valuable in indicating the amount of terminal service performed. Train switching measures the amount of local freight service. Yard switching measures the amount of terminal switching service by switching locomotives. These units are frequently used in connection with the freight train miles to make comparison between railroads of the relative amount of terminal service. The unit which is frequently used is the percentage of train or yard switching locomotive-miles to road locomotive-miles or train-miles.

#### Relative Amount of Yard Switching

Measuring the relative amount of yard switching service on two railroads by a comparison of the percentage of the yard switching locomotive-miles with the road locomotive- or train-miles is a fallacy unless conditions on the two railroads are similar. Some time ago, there was a case which involved on the one hand, railroads which had relatively light train load and a large amount of terminal service, and on the other hand, railroads with a heavy train load and relatively less yard service. Statistics were introduced by the latter railroads showing the percentage of yard switching locomotive-miles to freight train-miles. They indicated that the second group of railroads had a larger percentage of yard switching locomotive-miles to train-miles than did the railroads which were primarily terminal carriers. The fallacy of this unit lies in the fact that consideration is given to the numerator of this percentage, namely, the yard switching locomotive-miles, and no account taken of the denominator, the road train-miles. On account of the fact that the first group of railroads had a light train load, the train-miles were relatively high, while the second group, with a heavy train load, had train-miles relatively low. The percentage on the

second group of railroads was higher than on the first, not because there was a greater volume of yard work, but because they had the advantage of a heavy train load with the resulting small amount of train-miles. The work which must be performed by yard switching locomotives is not in handling trains, but cars. If any comparison is to be made of the volume of traffic with the volume of yard switching, it is obvious that it is much more reasonable to compare the yard switching locomotive-miles with car-miles than with train-miles. Incidentally, in the particular example given, when the car-miles were compared with the road switching-miles, an entirely different result was obtained. The same objection can be made in comparing the train switching locomotive-miles with the road train-miles.

As previously indicated, however, the chief value of this group of statistics is in applying the various mileage statistics to corresponding groups of expenses or man-hours. Maintenance of way expenses can be shown on a mile of road basis and with the use of the statement showing the classification of trackage, can be shown the basis of miles of main track or equated main track. Equipment repairs can be checked on a mileage basis. Moreover, the various factors of transportation expenses, especially with the division of expenses between passenger and freight, can be divided by the train-miles, car-miles, ton-miles or passenger-miles. Similar comparison can be made with the man-hour statistics.

#### Adequacy of Maintenance

In measuring the efficiency of performance, especially when comparison of the expenses is made with the revenue and operating ratios derived, too little attention is frequently given to the adequacy of maintenance. The fact is not appreciated that a low maintenance of way or equipment ratio may be due not only to efficiency in these departments, but also to high revenue or to inadequate maintenance. Adequacy of maintenance is an exceedingly difficult factor to measure, except with elaborate statistics. The I. C. C. report, however, does furnish some information as to the amount of replacement of various factors in track such as ties, rail and ballast. These data are of little value in comparing one railroad with another, but a reasonably accurate conclusion can be drawn as to one railroad by a comparison of the amount of replacement of these factors over a period of years. It should be kept in mind that they apply only to track and that the report furnishes no information as to the maintenance of the other factors under maintenance of way expenses, such as, bridges, buildings, signals, telegraph and telephone lines, etc., or to any of the factors in equipment. This is no criticism of the information furnished at the present time, because it is difficult to see how any information as to these other maintenance of way items could be given without an enormous amount of additional work for the carriers. Some information could be given in connection with maintenance of equipment. Some statistics of the locomotives given classified repairs and freight and passenger cars given heavy repairs, would be of considerable value. Most railroads at the present time compile information of this kind for their own benefit, and it would be quite possible to include such information without any additional burden.

It is certain that no complete picture can be drawn as to the efficiency of operation from the statistics unless some data as to the adequacy of maintenance are given. One of the very main-springs of efficient operation is properly maintained equipment, especially locomotives. Without some indication of the condition of this equipment, the picture cannot be made complete.

#### Material Disbursements; Equipment, etc.

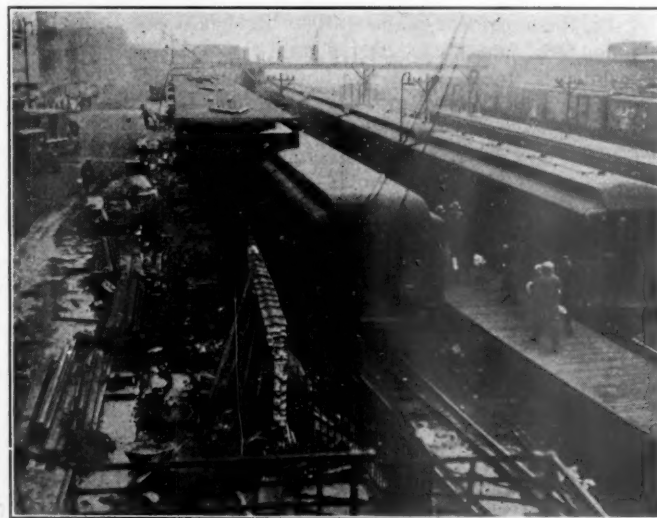
The features which have been covered do not include all of the statistics in the annual report which are of interest to

the analyst, but they do include most of those which cover factors of efficiency of operation. If a complete story is to be told of the efficiency of a railroad's management, an additional analysis should be made of the disbursements of material as shown by the operating expense accounts and the amount of material on hand. Attention should also be directed to the amount of equipment over a period of years as compared with the volume of traffic in order to determine to what extent the management is anticipating additional business and meeting this expected demand with the purchase of new and modern locomotives and cars. These articles have been devoted more to the analysis of operation itself and to the extent to which the efficiency of its operation can be measured by the statistics which are now available to the public.

#### Conclusions

From the foregoing, it may be seen that the annual report is an indispensable factor in the checking of the efficiency; that its value lies, first, in the fact that it provides a more complete picture than do the O. S. reports, and secondly, to the fact that it provides additional information, not elsewhere available, of the traffic and physical characteristics which the management of the line has to face. On the other hand, statistics in the annual report are susceptible to the same fallacious use as any other statistics when comparison is made as between railroads or groups of railroads. No one unit and no one report can be used to measure efficiency. All of the information must be analyzed and weighed before any accurate conclusion can be drawn. Even with a combination of all of the information now available in the annual and the monthly reports, there are still important gaps which, on an individual railroad, are filled by its own operating reports. For one who has not these reports conclusions as to efficiency must always be tempered with the thought that the whole story is not available. Railroad statistics are invaluable because they furnish the only concrete evidence we have, but they must always be used with caution and with full realization of their inherent weaknesses.

SERVICE ON THE ALASKA RAILROAD was resumed on November 1 following the completion of repairs to three bridges which were damaged by floods during October. The portion of the road affected was that south of Anchorage, about 100 miles.



P. & A.

Elevated Sidewalk Under Construction at an I. C. Suburban Station in Chicago—Part of General Improvement Program Prior to Electrification



# The Present Railway Situation in China

## A Resume of Personal Observations Made on a Recent Trip to that Country

By Col. Edward A. Simmons

CHINA, with a population of more than 400,000,000 people, is a country with only a nominal centralized government and in many ways is still more than a thousand years behind the times. Poverty reigns supreme; and graft, or "squeeze" as the Chinese call it, plays a considerable part in business routine, especially when the govern-

cerned. Add to that the fact there are but some 7,100 miles of railways in the country and substantially no new mileage contemplated for the immediate future, it is not hard to see that China is not an encouraging field for the American manufacturer of railway equipment and supplies. As a matter of fact, some of the government railways now owe

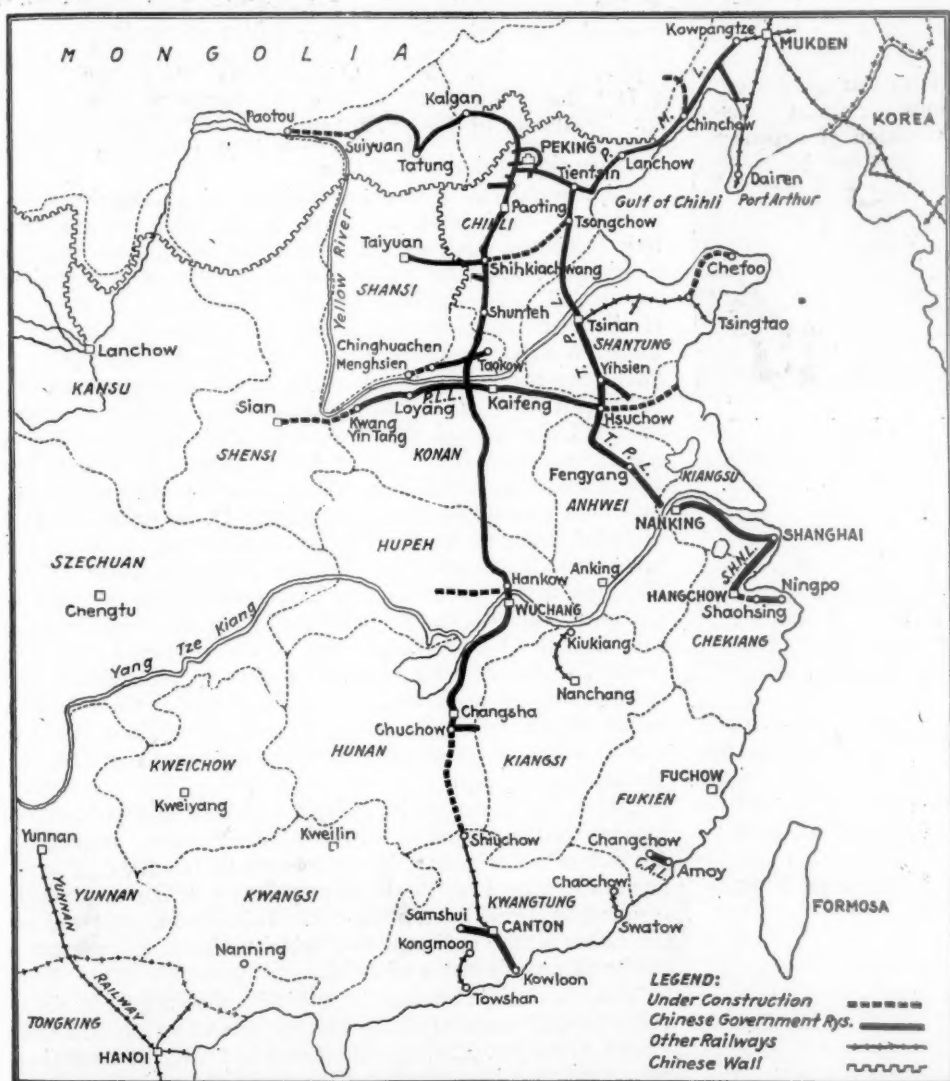
American and other foreign concerns about \$20,000,000 (gold) in the aggregate, much of which is two or more years overdue; and all of which is unsecured.

The latest published figures give the railway mileage of China as follows:

	Miles
Government lines in operation...	3,844
Government lines under construction .....	398
Provincial and private railways..	486
Total under control of Ministry of Communications.....	4,728
Concessioned railways .....	2,363
Total .....	7,091

In terms of acreage and population, China proper has approximately 276 square miles of territory and 54,000 population per mile of railway as against 40 square miles and 8,600 population in India, 16 square miles and 8,000 population in Japan proper and 12 square miles and 3,800 population in the United States.

To the foreigner, first class travel on the principal railways in China, while not exactly a pleasure, is not a hardship. This is especially true between Shanghai and Peking (the line on which a train was held up by bandits on May 6 last) and between Peking and Mukden. On the former route, between Pukow and Peking, the express trains are of steel, all of the equipment having been built in the United States. Compared with the standard Pullman sleeping car of steel construction, however, those on the Pukow-Tientsin line are "fliv-



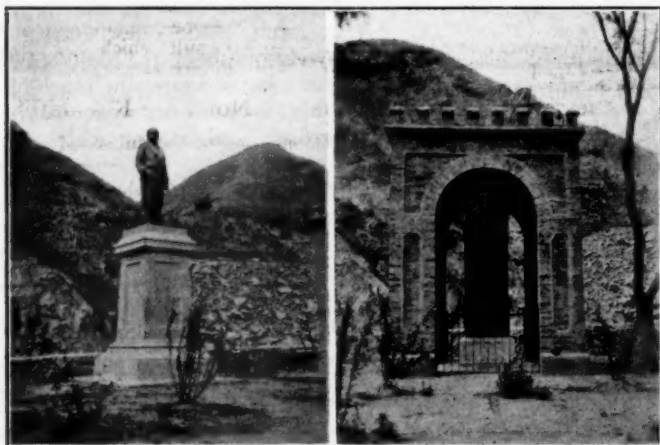
The Railways of China

ment is concerned. The pay of soldiers, sailors and police is habitually in arrears for months because those in command steal the funds, while military chiefs appropriate for their own purposes moneys collected by certain of the railways—being uniformly careful, however, to give receipts therefor so that the lines involved may render a proper accounting to the Minister of Communications. Beneath all of the turmoil is an under-current of dislike, if not actual hate, for the white race, notwithstanding public utterances to the contrary by those in authority, especially insofar as America is con-

cerned. According to common report the reason for the difference lies in the "squeeze" between the amount appropriated and the actual price paid to the builders. Although the trains had been in operation but three weeks before the writer went over the line, the light fingered Chinaman had appropriated all of the brass handles with which the windows opening from the compartments to the corridor of the cars had been fitted. Incidentally, it is characteristic of China generally that little interest is shown in the maintenance of anything. It is reflected in the rapid decay of famous

temples and palaces, for example, visits to which are now a waste of time and money. Fortunately for the safety of passengers who use the railways, the track is quite well maintained, notwithstanding that the natives sometimes remove spikes for conversion into farm implements; but the same cannot be said of the equipment, which is not only not kept in good physical condition but is dirty, frequently to the point of being disgusting. However, the meals served on the express trains are not half bad, sometimes, aside from the service, comparing favorably with the average of American railway dining cars. As few natives travel first class while most foreigners do, it is easy to understand why the food palatable to the latter is provided.

The accompanying map, prepared by the Department of Railways of the Ministry of Communications for the annual



Left—Statue of Dr. Jeme, a Yale Graduate, Engineer of Construction of the Peking-Suiyuan Line at a Station Along the Line. Right—Tablet in Memory of Dr. Jeme Located Beside Statue

report for the year 1921 which was published in English only in April of this year, shows both government and private existing lines and those under construction. A number of "concessions" for additional mileage have been granted; but there is no likelihood that any of the projected lines will be built in the near future, if at all.

The most progressive step of recent origin is to be found in the attempt that is being made to arrive at an understanding with the Chinese Eastern and the railways of Japan for the interchange of freight traffic. Conferences with Chinese Eastern officials with reference to classification and through rates have been productive and it is believed that the Japanese railways, at least those owned by the government, will readily assent to any reciprocal plan.

THE GREAT NORTHERN has offered to pay the railroad fares of three agricultural students from each high school on its lines in Montana to a stock judging contest and vocational conference to be held at Bozeman, Mont., on January 4 to 17, 1924. This proposal was made to stimulate interest in better livestock raising and farming among its patrons. In addition, the Great Northern has made a rate of a fare and a third for the round trip to all persons attending the conference. In 1923, 200 agricultural students took advantage of the offer of the road and it is expected that the number will be considerably increased in 1924. Similar arrangements were made in Washington for agricultural students to visit the Agricultural College at Pullman, Wash., and the same plan has been authorized for 1924. This was also done in North Dakota in 1923 and will be continued next year, the conference being held at the Agricultural College in Fargo, N. D.

## Labor Board Acts In Virginian Enginemen's Strike

AT THE FIRST DAY'S HEARING before the Railroad Labor Board on November 14 on the dispute between the firemen and enginemen on the Virginian and officers of the road which culminated in a strike on November 8, testimony was confined to statements by both parties in regard to the grievances which had caused the dispute. For the most part the trouble was confined to incidents which had occurred during the shopmen's strike in 1922 when the trainmen had refused to accept motive power for service on account of its being in an alleged unsafe condition. Testimony by officers of the road indicated that the attitude taken by the enginemen was unusual and attributable to their desire to aid the shopmen in their strike. No mention was made during the first day of the hearing of the action of the striking enginemen in disregarding the order of the Labor Board to continue at work until the case had been heard. Brotherhood officers claimed outside the hearing room that this order was served after the men had left their work, but the representatives of the Virginian declared that they could prove that the order had been received prior to that time.

Representatives of the Brotherhood of Locomotive Firemen and Enginemen and the Brotherhood of Locomotive Engineers and officers of the Virginian were ordered to appear before the Labor Board on November 14 when the board was notified by Vice-President C. H. Hix of the Virginian that the firemen and engineers were determined to strike on November 8. Between 400 and 500 men, about two-thirds of the train and engine employees on the road, quit work as they had planned, disregarding the order of the Labor Board that they keep their places until the controversy had been settled by arbitration. The Labor Board's orders, which were disregarded by the enginemen, were sent also to Warren S. Stone and D. B. Robertson and included summons to these brotherhood executives to appear before the board on November 14. Vice-President O. D. Hopkins of the Brotherhood of Locomotive Firemen and Enginemen, who was in Norfolk, Va., when the strike started, said that the Labor Board's orders were received after the strike had begun. He also stated that the men would not return to their work in spite of the board's decree. The Labor Board is empowered to assume jurisdiction in such controversies on its own initiative under Section 307 of the Transportation Act.

The strike was caused by objection of the firemen and engineers to the discharge of 12 of their fellow employees. Instead of submitting their grievances to the Labor Board, as provided by law, the workers polled a strike vote which resulted in favor of a walk-out. Information received by the Labor Board indicated that the situation is an outgrowth of the shopmen's strike of 1922.

That the Virginian was hard hit by the strike was indicated in a telegram to B. W. Hooper, chairman of the Labor Board, from Mr. Hix, vice-president in charge of operation. He stated that in a number of cases freight trains had been tied up, the engine crews deserting the locomotives and draining the tanks and boilers of water. Permission was asked and granted the railroad to take steps to fill the vacancies resulting from the strike. This was done after the striking employees had been given 24 hours' notice to return to work on November 9. During the first days of the strike the attitude of the executives of the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen was one of approval of the strike action. This was thought by some to indicate that the future policy by these organizations will be to ignore the Labor Board's orders.



# Recapture Clause Before U. S. Supreme Court

## Counsel for 19 Roads as Amici Curiae Join in Attack on Constitutionality of Law

WASHINGTON, D. C.

**V**OLUMINOUS BRIEFS have been filed in the Supreme Court in the case in which the Dayton-Goose Creek Railway is attacking the so-called "recapture" or "excess earnings" clause of the Transportation Act as unconstitutional, and is seeking to have the Interstate Commerce Commission enjoined from requiring it to report or to pay to the commission half of its alleged excess earnings above 6 per cent on the estimated valuation of its property. Oral argument will be heard by the court shortly. The application of the Dayton-Goose Creek was dismissed by the district court for the eastern district of Texas, from whose decision the company is appealing. In addition to the elaborate brief filed by the appellant, which is a 25-mile line operating between Dayton and Goose Creek, Tex., a joint brief has been filed by 19 counsel, representing as many trunk line railroads, as amici curiae, taking the position that the provisions of the statute referred to, which they designate as the "income-appropriation" provisions, are not a regulation of interstate commerce, but amount to a direct confiscation of carriers' property and invasion of their property rights in violation of the fifth amendment to the Constitution.

Samuel W. Moore, counsel for the Kansas City Southern, has also filed a separate brief, and counsel for the Wabash, Western Maryland and St. Louis Southwestern have also filed a separate brief as amici curiae. Counsel for the National Association of Owners of Railroad Securities has filed a brief in support of the validity of the act, as amicus curiae, while the United States and the Interstate Commerce Commission, defendants, are represented in briefs filed by James M. Beck, solicitor general, and Blackburn Esterline, assistant to the solicitor general, and by P. J. Farrell, chief counsel of the Interstate Commerce Commission.

### Brief of the 19 Counsel

The nineteen counsel for the trunk lines in their briefs say that the whole theory of the recapture provision rests upon the proposition that Congress may fix a standard of excess income and can prevent income realized in excess of that standard from becoming the carrier's absolute property by declaration that such portion of its income is received by it as trustee. They argue, however, that the net income realized from the performance of the act of interstate commerce is a matter subsequent to and distinct from the commerce as fully as the manufacture of goods to be shipped in interstate commerce and the mining of coal to be similarly shipped or to be used in the performance of interstate commerce are matters prior to and distinct from the commerce itself. Congress may, through the regulation of their rates, legitimately regulate and limit the operating revenues, they continue, pointing out that this power was exercised in the New England divisions case, but they assert that the income and appropriation provisions are not and do not purport to be a regulation of rates.

### Principal Points in the Brief

The principal points argued in the brief are as follows:

The net income which is the subject of the income-appropriation provisions is the unqualified property of the carriers and evidences elements of value inherent in their railroads. A taking of the income is a confiscation not only of the amount in money so taken but also of a part of the value of the railroads themselves.

The net income is earned from rates which must be presumed to be reasonable, and so is absolute property.

The statutory declarations that the income to be appropriated

is excess income and that it is held in trust are not competent to qualify the title of the carriers thereto.

This attempted appropriation of income is not an indirect or consequential result of any legitimate exercise of congressional power, but is a direct confiscation of property.

The allocation of a part of the net railway operating income to a reserve fund and the restriction upon the use of such fund by the carrier amount in legal effect to a deprivation of property without due process, equally with the complete appropriation of a portion of the net railway operating income.

The income-appropriation provisions cannot be sustained on the theory that their result is equivalent to a result which might be obtained by prescribing different rates for different roads.

### Income-Appropriation Provisions Not Rate Regulation

The income-appropriation provisions cannot be sustained as a regulation of rates.

Considering the income-appropriation provisions as attempted rate regulation, on the theory of a seizure of the proceeds of rates impliedly declared to be unreasonable, they are void because of their want of due process of law, in that the amount of net income is arbitrarily made the sole and conclusive measure of the unreasonableness of the rates.

To construct the income-appropriation provisions as a regulation of rates would do violence to the whole theory upon which rate regulation rests. The right of the government to regulate the charges for the use of properties impressed with a public trust rests upon the theory that without such regulation the owner may exact from the individual patrons unreasonably high rates.

### Not an Exercise of Taxing Power

The income-appropriation provisions cannot be sustained as an exercise of the taxing power.

The provisions in question do not purport to be an exercise of the power of taxation.

But even if the appropriation of income were labelled as a tax law it would be void because its real purpose, ascertainable from the act itself, is the limitation of the amount of income which a carrier shall be entitled to retain, an object not within the power of Congress.

This appropriation cannot be sustained as a contribution imposed, incidentally to the commerce power, to create the fund called general railroad contingent fund, as a burden which the industry should bear.

### Effects on "Weak Roads"

Regarding the theory that the recapture provision will be of benefit to the weak roads, through the use of the general railroad contingent fund to be built up out of "excess" earnings, the brief says:

"The problem of the 'weak roads' was not solved by this enactment. The rule of rate-making on the group basis may be calculated to effect some improvement in the earnings of the weak roads, but it is inherent in this rule that the weak roads will earn less than the average roads of the group, and, therefore, will realize less than a 'fair return.' The general railroad contingent fund established through the appropriations of income made from the stronger roads is to be used either by making loans to carriers to meet expenditures for capital account or to refund maturing securities or for acquiring transportation equipment and facilities to be leased to carriers. Such loans are required to be made at 6 per cent and are restricted to cases in which the prospective earnings power of the carrier and the security offered by it furnish reasonable assurance of its ability to repay the loan. Leases of equipment and facilities acquired with this fund may be made only when the commission finds that the prospective earning power of the carrier furnishes reasonable assurance of its ability to pay the rental and meet its other obligations under the lease, and the rental charges must be such as to pay a return of 6 per cent and an allowance for depreciation upon the valuation of the equipment or facilities so leased. (Paragraphs (10) to (14) of section 15-a.) It would appear doubtful whether, under these restrictions, the general railroad contingent fund will be at all available to the weak roads for aid in new financing or refunding of old obligations or in acquiring equipment and additional facilities—certainly the fund is not designed for their special and particular benefit.

"From a consideration of the committee reports and an analysis of the pertinent provisions of the law as enacted, the conclusion

is irresistible that the income-appropriation provisions have little, if any, relation to the problem of the weak roads, but are designed simply to prevent the realization by the stronger roads of a net railway operating income in excess of an amount which Congress was willing they should retain."

### The Roads Involved

The brief was signed by Joseph Paxton Blair, of the Southern Pacific; Edgar H. Boles, Lehigh Valley; John F. Bowie, Western Pacific; Robert J. Cary, New York Central; Henry W. Clark, Union Pacific; Herbert Fitzpatrick, Chesapeake & Ohio; Lawrence Greer, Western Maryland; W. S. Horton, Illinois Central; William S. Jenney, Delaware, Lackawanna & Western; E. W. Knight, Virginian; Richard V. Lindabury, Duluth, Missabe & Northern; Will H. Lyford, Chicago & Eastern Illinois; William Church Osborn, El Paso & Southwestern; Winslow S. Pierce, St. Louis-Southwestern and Wabash; Henry V. Poor, Pere Marquette; John H. Agate, New York, Chicago & St. Louis, and Carl A. de Gersdorff, New Orleans, Texas & Mexico.

### I. C. C. Brief

Mr. Farrell for the commission reiterates the position taken in the lower court, that the orders of the commission relative to excess income are simply admonitory and intended to remind the carrier of the requirements of Paragraph 6 of section 15-a of the interstate commerce act. He also defends the provision as representing a part of the general purpose of the act, for providing the means by which the necessary railway operating revenues might be secured, saying that the end sought by Congress under section 15-a was to maintain an adequate national railway system. "That this end is legitimate will not, we feel certain, be controverted," he said, "and that the provisions referred to are appropriate and plainly adapted to that end appears to us to be equally clear." After referring to the statement of the lower court that Congress had in effect levied an excise tax on all carriers subject to the Transportation Act, Mr. Farrell continues:

Regardless, however, of the power of Congress under the Constitution to provide for the levying and collecting of taxes, we think it is apparent that the provisions of section 15-a, whose validity is called in question by appellant, may be upheld as portions of a scheme of regulation of interstate and foreign commerce which Congress has a constitutional right to create and put in force.

That the power to prescribe and otherwise regulate the rates, fares, and charges of common carriers engaged in the transportation of passengers and property in interstate and foreign commerce is legislative in character, and that Congress, directly and through such agencies as it may from time to time designate for the purpose, may exercise such power fully and completely, is so well settled by decisions of the federal courts that a citation of authorities in this connection does not appear to us to be necessary. The general rule to be followed by courts in cases like the one under consideration here was stated by Mr. Chief Justice Fuller in *McChord vs. Louisville & Nashville Railroad Company*, 183 U. S. 483, as follows:

"\* \* \* The fixing of rates is essentially legislative in its character, and the general rule is that legislative action cannot be interfered with by injunction." (Id. 495.)

Because of the facts and circumstances disclosed by the record in this case, and in view of the court decisions to which we have called attention, we are unable to see how this court can sustain either the contention of appellant that the provisions of section 15-a relating to excess net railway operating income are unconstitutional, or its contention that the orders of the commission are invalid, unless the court concludes that an application of the limitations prescribed by Congress and contained in paragraph (6) of said section would result in such a confiscation of appellant's property as is prohibited by the Constitution. We have shown that in no case do the limitations confine a carrier to a return of less than 6 per cent per annum upon the value of the property held for and used by it in the service of transportation, and we are not aware of any decision of a federal court wherein like limitations prescribed by Congress have been held to be unconstitutional. We are therefore of opinion that further discussion by us in this connection is not necessary and would not be appropriate.

For the reasons above set forth we insist that the appeal in this case should be dismissed.

### Government Says Recapture Clause

#### is Necessary Part of Act

The government brief, filed by Mr. Beck and Mr. Esterline, says that the question before the court is whether an adequate system of railway transportation throughout the continental United States shall be maintained, and to that end whether the Transportation Act of 1920 is the valid exercise of congressional power. "Whether a particular clause of that act is constitutional when torn from its setting is decidedly *not* the question," the brief said. "The act stands before the court with all of the presumptions of validity. Moreover, the act has thrice been sustained in practically all its aspects in as many opinions of this court. (Railroad Commission of Wisconsin vs. C. B. & Q. R. R. Co.; Pennsylvania Railroad vs. Railroad Labor Board; New England Divisions Case.)"

The brief discusses at considerable length the history of the Transportation Act and the purposes for which it was passed, and in discussing the condition of the railroads before they were taken over by the government and the conditions that existed at the time of their return for the purpose of showing the background of circumstances in which the act was passed, the brief says:

"The government found the railroads in a deplorable condition. They had been subjected not merely to double, but to quadruple regulation by governmental and non-governmental powers. The government of the United States since 1887 had tried to regulate them by affirmative legislation. The states continued to regulate them so far as this court in enforcing the Constitution permitted them to do so. The great railroad labor organizations, whose power for the time being was almost omnipotent in the matter of wages, regulated the largest part of their expenditures by compelling them to increase wages until these wages had been increased far more than the entire amount of the net revenues of the railroads in the year before. The great banking institutions which were the sources of credit regulated the railroads by prescribing the conditions upon which they could obtain money to build extensions or operate the railroads. The fact is that the railroads had been regulated almost to their destruction. The goose that laid the golden egg was well-nigh moribund. The whole system as an efficient transportation system had broken down." The brief continues:

In enacting the transportation act the Congress was avowedly considering the transportation system throughout the continental United States as a whole. To hold that the Congress enacted the broad provisions to raise revenue, to prescribe divisions, to provide for settlement of disputes between carriers and their employees, and for other equally important purposes, in order to maintain an adequate transportation system, and then to annul and strike down the standard or basis for which these enormous increased revenues are to be raised and equitably distributed or placed, would defeat the whole intention of the Congress and bring about a situation more destructive to the public interest than if no part of the act had ever been passed.

Never in its history has Congress enacted a statute in which the sections were so closely interlocked and dependent each upon the other. The Congress was considering "the transportation needs of the country." If paragraphs (5) and (6) of section 422 are torn from the body of the act, the whole foundation of the entire legislation scheme fails.

What was said in the opinion of the court (in the New England Division case) respecting the scope of the transportation act and the various sections thereof was made after full discussion of all of those subjects at the bar and after most careful consideration by this court. It is submitted that the opinion is just as conclusive of the validity of the recapture paragraphs as if those paragraphs had been the immediate subject of the controversy instead of the so-called divisions paragraphs. If the court thinks otherwise, then it is submitted that the reasoning in the New England Divisions Case is so highly persuasive as to be controlling.

In the New England Divisions Case the commission considered the respective needs of the several carriers in the distribution of the revenue after it was acquired by the carriers and before the net railway operating income reached 6 per cent of the value of the railway property held for and used by each carrier in the



service of transportation. In the instant case the net has exceeded the 6 per cent. The constitutional rights of the complainant under the transportation act have thus been fully satisfied. The whole controversy is over the overflow. Thus, the questions disposed of in the New England Divisions Case reached heights far beyond anything now claimed by the appellant and the amici curiae under the recapture clause. If the Congress may authorize the commission to direct the distribution among the weaker lines of much needed earnings to maintain an adequate transportation system, a fortiori, it may direct the recapture of excess earnings of those who have waxed fat under the transportation act. Swollen earnings derived from necessarily general rates for transportation which the public must pay are not guaranteed by the Constitution.

In both Houses of Congress the opposition debates waged over section 422, and hammered the so-called guaranty and recapture provisions. The most strenuous opposition was interposed to the former. The records of the Congress will bear the construction that without the recapture provision section 422 would have failed utterly. But reference to the records of Congress is unnecessary. To argue that paragraphs (5) and (6) may now be segregated and adjudged unconstitutional and the so-called guaranty paragraphs allowed to stand is contrary to the whole theory of the act.

The court will not and ought not to look at the situation in a vacuum. It will look at it as a practical problem. It will realize that the rule in the transportation act was designed to help the transportation situation and did help it. If the railroads had gone back to private control without the specific rate-making rule prescribed in the transportation act, no reasonable person will doubt that the railroads could not have increased their rates to anything like the extent they were permitted to increase them under the transportation act. If the more fragmentary rules which had theretofore been applied had been applied to the new situation, it is perfectly clear that the net increase would have been much smaller. It would be surprising if a rule which was intended to be more liberal in practice to the railroads, and which in fact was more liberal to them, should be regarded as unconstitutional, when the rules theretofore in effect of a more fragmentary character and affording less protection to the carriers would be regarded as constitutional.

In reply to the arguments of the railroad counsel, the government brief says that amici curiae should not be allowed to stand for the validity of and claim the benefits under an

act constructed as the Transportation Act and in the same breath assert the unconstitutionality of its limitations. It pointed out that the 19 trunk lines represent approximately 69,000 miles of railroad, and this fact, it is said, "no longer makes the case one between the Dayton-Goose Creek Railway and the government; it is now a case in which practically the entire system of railway transportation has representation." Attention is also called to the appearance of division of opinion, not only among the companies themselves, but between the association representing the owners of securities and the companies as well.

The brief of the Dayton-Goose Creek argues that the recapture clause violates the fifth and tenth amendments, that it does not assess or levy a tax, and that the record does not show a valuation upon which the quantum of the so-called excess earnings may be recaptured. The government brief points out that counsel for the Dayton-Goose Creek have adopted the expressions "recapture clause" and "excess earnings" and have used them throughout the brief, whereas the counsel for the 19 lines rejected these designations. Counsel for the Kansas City Southern in his separate brief contends that for the purpose of the recapture clause the act requires the ascertainment of economic value. Counsel for the Wabash, Western Maryland and St. Louis Southwestern contend that 6 per cent is not a fair return upon railway property in any part of the country, but that even if 6 per cent is a fair return in some parts of the country, section 15-a is unconstitutional and void, because it attempts to fix 6 per cent as a proper rate in every part of the country. In commenting on these briefs the government brief says:

"Counsel who appear against the government are numerous and so divided, even though they represent like interests, that they file separate briefs. Lack of unanimity on the part of those so gravely affected goes far to sustain the law. The diversity of their arguments betrayeth them."

## Some Operating Phases of Maintenance of Way\*

### What Can Be Done to Increase Economy and Avoid Interference With the Movement of Traffic

By E. T. Howson

Western Editor, *Railway Age*

**D**URING THE LAST year the railways of the United States have broken all records for the amount of freight service they have rendered the American public. Not only have they handled a traffic materially exceeding that of any previous period, but they have done this without any large increase in facilities, and they have at the same time met practically all demands for service. In doing this, they have surprised even their most ardent advocates.

Prior to 1923 it had been commonly considered that the railways were working to their capacity when handling a traffic involving the loading of 1,000,000 cars per week. This figure had been exceeded only seven times in history and then only slightly, and those records were accompanied by large car shortages, congested terminals and widespread complaints regarding inadequacy of service. Furthermore, these million car records were established for single weeks only during the height of the fall grain movement and were not sustained.

This year the traffic arose to million car proportions in the spring, and has been maintained at this rate continuously for

more than five months, the only exceptions being those weeks in which holidays caused a curtailment in industrial operations. The previous high record of car loadings, 1,018,000, established in 1920, has been exceeded repeatedly. In fact, the average loadings for the last four months have exceeded the highest figure ever reached for a single week prior to this year and the traffic is still increasing, the highest figure ever attained in history being established during the week ending September 29, when 1,097,274 cars were loaded.

#### Traffic Has Exceeded Estimates

Early last spring the Car Service division of the American Railway Association saw the probabilities of a heavy traffic this year and made an estimate of the volume to be expected from week to week throughout the remainder of the year, in which it was concluded that a maximum of approximately 1,085,000 cars per week would be attained in October. Not only have these estimates been exceeded consistently from week to week, but the maximum was exceeded by more than 10,000 cars a month ahead of the date on which the traffic usually reaches its height.

Never before has a traffic involving the loading of a million

\*Presented before the Pacific Railway Club on October 25 at San Francisco, Cal.

cars a week been handled without a shortage of at least 100,000 cars, and this shortage at one time reached 179,700 cars. This condition has caused heavy losses to business because of inability to make shipments and because of delay in their movement after loading. In marked contrast to this condition, the record-breaking traffic of this year has been handled without a shortage of equipment at any time. In fact, there has been a minimum surplus of 40,000 cars, and any lack of facilities which may have been experienced has been due to unequal distribution and improper use of cars and has been slight and of short duration.

While it is true that the roads have ordered large numbers of cars and that this equipment has been of great value in the movement of this traffic, the total number of cars in service today, including this new equipment, is actually less than the number in use three years ago, owing to the failure of replacements to keep pace with the retirement of obsolete or worn out equipment.

The marked contrast between the conditions which now prevail and those which have existed in previous periods of similarly heavy business is not due to additions to the equipment, as has already been pointed out. Neither is it due to any large additions to other physical facilities. It is true that the roads are spending more than a billion dollars during the present year for improvements which will eliminate congestion and reduce delays at certain points, but the effect of these improvements on the capacity of the railways as a whole has been relatively small as yet, and one must look farther for the explanation of the records now being made.

#### Better Use of Existing Plant

The explanation of their performance is the fact that the railways are using the existing plant more intensively than ever before was thought possible. I believe that this is indicative of the trend of the development which will characterize railway progress during the next decade.

In the past, periods of heavy traffic have been accompanied by broad programs of improvements and additions to facilities. Heavy traffic has been accompanied by large earnings, which made it relatively easy to finance improvements and secure added capacity in this way. While I do not desire to minimize in the least the necessity for a continuous program of development to keep pace with the growing demands of traffic, I do believe that the increasingly strict regulation of the railroads and the limitations on the rate of return which now exist will cause the roads, and particularly those with less favorable earnings, to make expenditures for improvements more sparingly and that the railways as a whole will be forced to find new ways to increase the output of their plants by their more intensive utilization.

This will not be entirely without its beneficial results. Transportation is a necessity of our modern industrial life. It enters into the cost of practically everything we purchase. Among the elements entering into the expense of producing transportation is the return on the investment in the property devoted to its production. If the output of this property in ton miles and passenger miles can be increased by its more intensive utilization, and the return on the investment thereby distributed over a greater number of units, the proportion charged to each unit is reduced and the cost of transportation likewise lowered. Furthermore, the funds which would otherwise have been expended for added facilities are left available for other and more pressing purposes.

There has never been a time when railway men have worked together as a unit to produce transportation like they have this year. From the very necessities of the situation they have concentrated on those measures which have made possible the uniform flow of traffic. In doing this they have developed numerous expedients which will be of lasting benefit and which, I believe, point the way to still more intensive utilization of the facilities we already have. To illustrate,

let me refer to two or three ways in which a few roads are now securing more work from their present facilities by revising the established methods of operation.

#### The "Main Tracker"

As you know, it has long been the custom of practically all roads to classify cars carrying other than perishable freight into trains at each terminal and to forward them to the next terminal 100 miles further and again classify them, this operation being repeated at each terminal until the cars reach their destination. About three or four years ago officers of the Baltimore & Ohio made a detailed study and analysis of its traffic and terminal facilities from which they developed a plan whereby each car early in its movement is placed in a train which moves intact through intermediate terminals to destination. The immediate result of this plan has been to reduce the amount of switching on this road by one-third. In addition to saving more than \$6,000,000 annually in expenses, many locomotives have been released for other service and the need for additional facilities at numerous points has been postponed.

On another road which applied this "main tracker" principle less extensively, the first effect was to reduce the number of switch engine shifts by sixty, effecting a saving estimated at \$1,500,000 the first year, while the delivery of freight at remote points was advanced from fifth morning to fourth morning.

Another opportunity for the more intensive utilization of property is afforded on lines of two or more tracks. It is the prevailing practice on such lines to operate trains on one track, in one direction only, making it necessary for inferior trains to enter side tracks to allow superior trains to pass them, even though the opposite main track is idle. By the introduction of relatively simple precautions, two or three roads now divert their faster moving trains to these opposite main tracks when they are idle and run them around the inferior trains without interfering with them. By this means, they avoid delaying these inferior trains and thereby get them over the road more rapidly and increase the capacity of the line. One such road on which this practice is in effect on a division of 125 miles estimates that a third track would be necessary for this entire distance to handle the traffic now moving over two tracks without congestion, if this practice were to be abandoned.

#### Longer Engine Runs

It has been customary from the beginning of the railroads for a locomotive to haul a train over one engine district of approximately 100 to 125 miles and then be replaced with another locomotive. Recently men have begun to inquire why it should be necessary for as expensive a unit as a modern locomotive to enter a roundhouse for inspection and repair after working only the few hours necessary to travel 100 miles. This has led to the inauguration of longer engine runs in both passenger and freight service during the last two years. On one road two engines now haul a passenger train a distance of approximately 1,000 miles where six locomotives were formerly required, and it is estimated that this one expedient has reduced the cost of operation of this road over \$1,500,000 per year, while releasing a number of locomotives for other service and at the same time releasing the facilities at the intermediate terminals for the care of other engines.

The capacity of another western road has been increased by another simple expedient. Every railroad officer is familiar with the tendency of many crews in freight train service to loaf, particularly on their trips away from home, in order to run into overtime and increase their earnings, which results not only in increasing the wage expense of the roads, but also in tying up locomotives and cars. Taking advantage of the universal desire of men to be home, a



superintendent offered to arrange to have a train ready for the return trip for every crew which made its run to its away-from-home terminal in 7½ hours or less, so that it could make a round trip within the 16 hour limit of service. The men were quick to take advantage of this with the result that the average time consumed by trains in going over this division was reduced from eleven to approximately seven hours, eliminating overtime and making it possible to make two round-trips with the locomotives in the time formerly required for one.

The achievement of the railroads during recent months, for I regard the records they have just made as an achievement of the highest order, has been made possible by the most intensive concentration in the production of transportation which we have ever witnessed. This concentration has prevailed in all departments and they have functioned in greater harmony with the common objective than ever before. I believe, however, that the future will demand still greater concentration by all railroad employees in the production of the one product of a railroad—transportation.

#### Co-ordinating the Departments

In an industry as large as the railroad industry, single units of which employ from 50,000 to 250,000 men, the division of work and of responsibility between departments is necessary. From this necessity have arisen the various major departments of railway service, including the transportation, the mechanical, the traffic, the maintenance of way, etc. In most cases these departments are further sub-divided. Thus we have the bridge, the signal and the water service, each a branch of the maintenance of way department and each in charge of a specialist who is held responsible for the conduct of operations within his more or less limited sphere in a way which will cause that department to synchronize most fully with the activities of other departments and form a smooth running machine known as a railroad.

It is of primary importance that each department perform properly those duties for which it was created. This calls for a high degree of specialization. This specialization, however, leads to the danger of over-emphasis of the department in which the employee loses sight of the fact that the primary purpose for which his department was created is not to furnish an outlet for his specialized training, but rather to produce transportation, and that his efforts and those of his department are justified only as they contribute to this end. The departmental idea is prevalent in all branches of railway service. The engineer is not alone who looks upon the railroads as an outlet for the display of his talent in designing great bridges and fails to see their relation to the plan of transportation. Neither is the transportation officer alone who sees solely the movement of trains to the disregard of the operations of those departments which makes the movement of trains possible.

The maintenance of way department is, from the very nature of its duties, brought into the most intimate contact with the transportation department, for many, and in fact most, of its operations affect the track and structures over which trains must pass. If congestion is to be avoided trains must be moved with little or no delay. On the other hand, as the number of trains increases, the inroads which traffic makes on the output of the maintenance forces affect the output and cost of this work very adversely. This calls for a careful analysis of methods and a close study of costs to determine that plan which will be most economical from all standpoints, and that department must be prepared to give way which loses the least, since all expenses must be paid from the one common purse. Although at first glance the opportunity of the maintenance of way department to promote the more intensive utilization of railway facilities is limited, the connection between many of its operations and the movement of trains is so direct that its opportunities are in fact

larger than generally realized. Present conditions are calling for the more thorough consideration of all methods affecting the movement of trains and it is possible that many methods of long standing in the conduct of maintenance work should be changed. It is to some of these methods that I desire to refer briefly.

#### Work Trains Are Expensive

The work train has long been a standard unit of equipment for maintenance of way operations. On some divisions trains are assigned to this service permanently while on others they are ordered for special work as required. Their use has been considered standard practice for so long that in many instances they are employed from force of habit even though the rising costs of wages and supplies and the increase in delays because of the heavier movement of revenue traffic have caused the cost of the work train service, measured in units of work done, to rise greatly. Also from a transportation standpoint every additional train on a line interferes with others and leads to congestion. It also requires locomotives and cars which would otherwise be available for revenue service.

Realizing the necessity for the use of every available unit of equipment and the elimination of all possible interference with traffic, the Car Service Division of the American Railway Association incorporated in its program of last April a suggestion that work trains be reduced to the minimum after September 1 of this year as one of its measures for the movement of the record breaking traffic which it anticipated. In compliance with this suggestion a number of roads have developed other expedients for the handling of work previously done by trains which offer wide possibilities.

The possibilities of the section motor car and trailer for the distribution of materials are being recognized to an increasing extent. It is becoming the common practice on a few roads to ship their ties out sufficiently in advance of their insertion in the track to enable their section forces to distribute them with their motor cars as they go over their sections daily and dispense with a work train for this purpose. The motor truck can also be utilized effectively in releasing work trains, especially in or adjacent to terminals. In a number of such localities the services of the work train have been dispensed with entirely while on at least one road motor trucks are utilized for the distribution of all materials other than rails and similarly heavy objects required by the maintenance of way forces on the line as well as in the terminals.

#### The Operating Department Can Help

No operation performed by the maintenance of way department interferes more seriously with train movements or is interfered with more seriously by trains than the laying of rail. In the early days when there were few trains the delays were not serious, but on many roads the traffic has now become so dense that it is impossible for a gang to make much progress and the cost of this work has risen greatly. Even with the most favorable grouping of trains, the productive time of the gangs is frequently reduced to less than 40 per cent of the time they are on the job. This condition not only increases the cost of the work, but it also causes it to be prolonged more than would otherwise be necessary.

To overcome these conditions the local transportation and maintenance of way officers on a few roads now co-operate in the development of a plan whereby the maintenance of way department is given the uninterrupted use of the track for all or the larger part of the working day, trains being moved in both directions over the remaining track, which is operated as a single track. While this adds to the complications of the transportation department temporarily in the movement of its trains over the particular section of the track on which the work is in progress and would appear to reduce rather

than to add to the capacity of the line, it enables the maintenance of way forces to complete their work more rapidly, thereby not only reducing the cost but eliminating interference with the movement of trains more quickly, and in the end has been found to facilitate operations, for it has been the common experience of the roads on which this practice has been tried that the temporary handicaps are less serious than might be expected and being concentrated can be given added supervision so that they do not add materially to the cost of operation.

### Watch the Slow Orders

Since every delay to trains reduces the capacity of a line to that extent, the causes of these delays should receive careful attention. Not a few of these delays are due to conditions under the control of maintenance of way officers. One of the most frequent is the use of slow orders. Such orders are, of course, necessary for the safe movement of trains and there are times when they are unavoidable. Under such circumstances constant attention should be given them to insure that they are not forgotten and that every reasonable effort is made to relieve the conditions giving rise to them at the earliest possible moment, in order that the speed limitations may be removed as soon as possible. A simple expedient to this end, which has been found valuable by one road, is the practice of requiring the chief dispatcher to furnish the division engineer and the roadmasters with a statement each morning showing the number and character of the slow orders outstanding on their respective territories. This statement serves as a constant reminder of the delays to which trains are subjected and as an incentive to the maintenance officers to remove them.

An investigation of the slow orders put out on almost any road will also show that a considerable number of them could have been avoided if proper precautions had been taken in advance. It is difficult, and in fact impossible, to anticipate all of the attacks to which a roadbed may be subjected, for the occasional flood or fire may strike at a point heretofore considered immune. However, many such conditions may be prevented by the adoption of adequate precautions. In other words, many of the so-called emergencies are not in reality emergencies at all, but are the result of failure to adopt reasonable precautions and can be eliminated by the substitution of a policy of *maintenance before* rather than *repair after*. This policy is of increasing importance as the density of traffic grows.

No condition interferes more seriously with the smooth operation of trains than derailments, not a few of which are due to defective condition of track. The first step in a campaign to reduce the number of derailments is the preparation of an analysis of the locations and conditions under which they are occurring. With this information it is frequently possible to detect the cause and to remove it with relatively little difficulty. Especially in a period such as this, when a delay to one train may cause serious delays to many others, it is important that close attention be given to this subject in order that all reasonable precautions may be taken to eliminate delays from this cause.

### Scheduling the Work

At the present time when the heavy traffic is adding materially to the wear and tear of the track and structure, it is important that every effort be made to secure the maximum improvement from the money which is available for maintenance. A program is essential to the most successful prosecution of any activity, yet insofar as the routine work of maintenance is concerned little is done. The larger projects such as the renewal of bridges and the relaying of rails appear on the schedules of most railroads, but even here it is seldom that a program of field operations is prepared in any detail. The larger amounts of money are not, however,

spent for these so-called major improvements but for the routine day-to-day repair work. It is here that, from the very nature of the duties, the danger of excessive loss of time is greatest. If a program is good for the large job, it is doubly important here, and railway officers can well afford to give it careful attention. My attention was called recently to a division on which the local maintenance officers went over every section with their foremen at the beginning of the year's work and prepared a schedule of the work to be done during that year, divided by months. With this before him, each foreman had an objective toward which he worked so that there was no occasion for delay on his part in deciding what was the next job to be undertaken when one was finished. The improvement which was effected on this division by this simple expedient, and without the expenditure of a single additional dollar, was very marked and did much to bring the line into better physical condition and thereby promoted the handling of trains.

Nor should attention be confined to the supervision of the smaller gangs for while the larger gangs are less numerous, the possibilities for loss in such gangs are greater. Every minute lost by a gang of 60 men is equivalent to a man hour, and eight minutes to a man day. There are few gangs in which several man days are not lost daily by lack of adequate direction. This suggests the detailed study of gang organization.

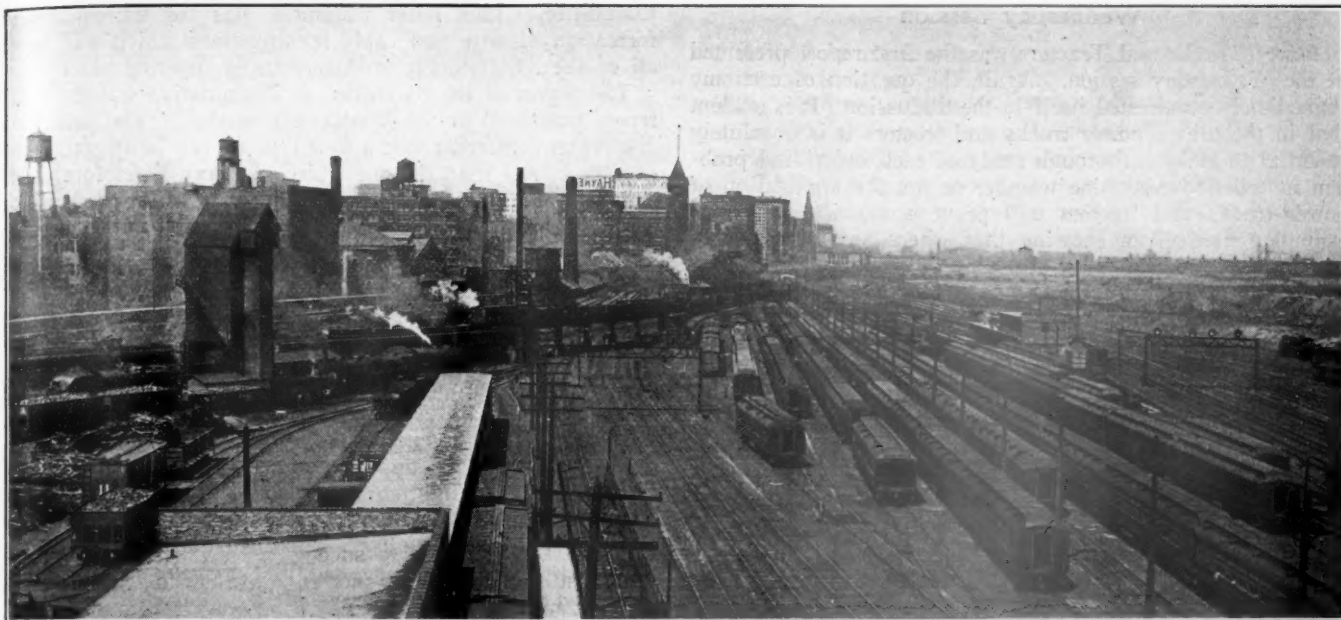
### Good Results Obtained

Such a study on one road recently led to the doubling of the output of a large rail laying gang and enabled it to complete its work and eliminate interference with traffic in half the time which would otherwise have been required. On another road this work has been so organized that rail is being relayed under traffic at the rate of a track mile an hour by a gang of 280 men with one work train. These are indicative of the possibilities of organization which contribute not only to the reduction in maintenance of way costs but also to the more rapid completion of the work and the elimination of slow orders and other interference with trains.

These suggestions for the conduct of maintenance work indicate the possibilities for the more thorough co-operation of maintenance of way and transportation officers in the planning and conduct of those operations which, from their nature, interfere with the movement of traffic so that this interference may be reduced to the minimum and that, by reason of the reduction of this interference, it may be possible to operate an increased number of trains and thereby increase the capacity of the line. I do not minimize in the least the necessity for the expenditure of large amounts of money in the immediate future for the provision of increased facilities which will add to the capacity of the roads, but these facilities should be added only as those which are now available are approaching use to their capacity.

AUTOMOBILE ACCIDENTS on the streets and highways seem to arouse the public but little compared with such accidents at railroad crossings. On Sumner avenue in this city is a highway crossing over which perhaps six or eight trains pass daily on a single track, at slow speed, and supposedly with a whistle and a preliminary stop, while the public is further warned by an automatic device. Yet one accident at this crossing without serious consequence has inspired more agitation this year than all the accidents in the streets of the city, some of them fatal. One could literally hold a public dance on the Sumner avenue crossing without disturbance from the railroad in 23½ hours out of the 24 and with abundant warning at other times. But there are places on State street which it is impossible to cross at any hour of the day with any certainty of reaching the other side, on account of motor vehicles moving over unconfined tracks at two or three times the speed of the few trains on the railroad crossing Sumner avenue.—Springfield (Mass.) Republican.





Illinois Central Yards, Chicago

## Railway Electrical Engineers Meet at Chicago

Annual Convention of the A. R. E. E. Draws Record  
Breaking Attendance of Railroad and Supply Men

THE FOURTEENTH ANNUAL CONVENTION of the Association of Railway Electrical Engineers held at Hotel La Salle, Chicago, November 6 to 9 had the largest attendance of any meeting ever held in the history of the association. Not only was the number of railroad men larger than in the past, but the Railway Electrical Supply Manufacturers Association, which always exhibits electrical equipment in conjunction with this convention, was unable to provide sufficient space to accommodate all of its members who wished to exhibit. The booths were frequently crowded and at times the aisles were almost impassable.

The first session was opened at 10 o'clock Tuesday morning, November 6, with an address by president, E. S. M. MacNab of the Canadian Pacific. In his address, Mr. MacNab drew especial attention to the need for the development of economical practices so far as lies within the province of the electrical engineers. The mounting costs of material and apparatus of all kinds without any appreciable increase in the revenue of the roads has brought about a condition where the most careful consideration must be given to the economical functioning of each and every department. The inherent economies so readily secured by the use of the electrical appliances put the problem more squarely up to the electrical engineer perhaps than to any other railroad officer.

In the general discussion following the president's address, it was readily apparent that the electrical men themselves were alive to the situation, but that owing to the ultra-conservatism of many railroad managements it was almost impossible to put over an electrical program which would show any marked reduction in operating expense. The discussion brought out that the difficulty appears to be caused both by the electrical men and by the managements. In many instances the engineers have failed to secure sufficient data to present their case in a convincing form. On the other hand conservative managements accept reluctantly or not at all the introduction of electrical devices and the net result is that

where thousands of dollars might be saved annually, old methods are continued and economical operation remains impossible.

From the electrical engineer's point of view there is but one thing to be done and that is for him to fortify himself with cost data that will make it possible for him to show the actual savings in dollars that will accrue from the installation of equipment which he knows should be put in.

During the discussion it became more and more manifest that the outstanding duty of the electrical engineer to his road was that of showing economies more than the mere laying out of some electrical installation. It was readily recognized that practically any problem could be met with an electrical solution, but that the real crux of the situation was that the figures representing the saving in dollars were too frequently lacking. Fortunately for some of the roads, their electrical engineers have been securing this financial data and the result has been a tremendous increase in the use of electrical apparatus on those roads.

The report of the committee on data and information which was the only report presented at the first session showed clearly that there is a constantly increasing growth in the use of electrical equipment of all kinds. When the economies to be enjoyed from its use are more generally recognized, it is a practical certainty that the railroads will be among the largest if not the largest users of electrical appliances in this country.

The report of the secretary treasurer showed the association to be in excellent financial condition. The number of new members recently joining the association and who were introduced to the convention at the first session was very much larger than ever before. Among the new members were men from roads that had never before been represented in the association while the number of those from Canadian lines was very much greater than at any previous convention.

### Wednesday Session

Power Trucks and Tractors was the first report presented at the Wednesday session. Again the question of economy immediately manifested itself in the discussion. It is evident that in the use of power trucks and tractors it is absolutely essential to make a thorough study of each individual problem in order to determine whether or not the application of power trucks and tractors will prove economical. Several examples were given showing that where any considerable amount of material must be moved, power trucks offer wonderful possibilities for the saving of money. One was cited in the unloading of a large steamer at Port McNicoll on the Canadian Pacific. At this point 26 trucks were operated by approximately the same number of drivers and it was estimated that in order to handle the same amount of work in the same time by hand trucks would have required at least 120 men. Under such conditions the economic possibilities of power trucks are readily apparent.

Unfortunately, it was pointed out, these trucks are frequently purchased by superintendents, freightmen or by the baggage departments without ever consulting the mechanical or electrical forces at all. The result is that owing to the lack of proper facilities for maintenance which is a most important adjunct the truck breaks down and is condemned when the fault does not lie in the truck at all but in the fact that no suitable provision had been made for its care.

The crane type of truck is apparently becoming very popular in railroad work particularly in dismantling and assembling certain parts of locomotives. A word of caution was given, however, to the effect that with regard to this type of truck or to any other highly specialized design unless it can be kept busy for the greater part of the time the investment in such equipment could scarcely be justified. In any event the amount of use that will be made of specialized trucks determines whether or not they should be purchased.

The heavy electric traction report which was next presented was very much shorter this year than it has been in the past. The whole thought of the committee was to call to the attention of the members a few of the outstanding characteristics of power distribution on an electrified section with reference to the probable increase in traffic. In this connection, the subject of automatic substations was discussed and although only one installation of this kind has been used on an electrified road it was generally conceded to be a very satisfactory method of keeping up the voltage where increased traffic had made greater demands for electric energy. Little or nothing was said concerning the relative merits of a.c. or d.c. electrification, it apparently being the general view that time has demonstrated that both alternating and direct current systems will give satisfaction. Considerable investigation has been in progress on the Canadian National Railways, which has no heavy grades, with regard to electrification and the conclusion has been reached that unless there is some special problem to solve such as a tunnel, a congestion or a smoke nuisance, the installation of an electrified system so far as main line level track is concerned cannot be justified. On the other hand, the electrification of certain branch lines seems to give promise of satisfactory results and about 50 miles of branch line is actually under way. This method seems a very logical way of handling light freight and passengers and when the plans are completed there will be about 200 miles on the Canadian National Railways. The trolley voltage used in this service is 1,500 and the freight service is performed by trains of not more than 10 cars.

The next report presented was that of the committee on insulated wires and cables. This report was really in the nature of a progress report as the committee is merely a sponsor committee representing the Association of Railway Electrical Engineers in the American Engineering Standards

Committee. This latter committee has for its object the formation of wire and cable specifications which will meet all of the requirements of American engineering practice.

The report of the committee on illumination was the final report presented at the Wednesday session. The principal discussion centered about a new type of cab lamp somewhat smaller in size than the one which has been heretofore used.

A year ago the committee asked that some of the roads make use of the new lamp so that it could be tried out in service but apparently had not been tried during the past year. The committee pointed out that it is very desirable to have a large enough number of these lamps put in service that definite conclusions may be drawn regarding their behavior.

The subject of flood lighting in yards provoked a great deal of discussion and it was evident that good yard lighting is a most important issue on every road. There seems to be a considerable divergence of opinion however as to how such lighting ought to be applied. Some of the members contended that flood lighting lamps so placed as to direct the light beams in the direction of the tracks produced too much glare when it was necessary to look in the direction of the light source. It was suggested that lighting could be arranged so as to make objects visible by silhouette. The concluding thought of the discussion was that the subject of yard lighting is apparently one which will stand considerable amount of study and investigation before any arrangement can be arrived at that will be satisfactory to all.

### Thursday Session

In presenting the report on motor specifications considerable discussion arose as to whether or not the specifications as presented could be used in ordering motors through the purchasing agents of the various roads. The discussion developed that inasmuch as representatives of practically every motor manufacturer in the country served on this committee that the several companies making motors were entirely familiar with the specifications and were prepared to furnish motors which would meet them in every respect. The specifications as drawn provide for more rugged construction than is often found in motors, particularly in the matter of bearings. The use which electric motors receive in railroad service is so severe that it was felt special factors of safety should be incorporated in the design of motors for such use and the committee was appointed to develop the necessary specifications which might bring about the end desired.

In the report of the welding committee which was next presented the economic factor was again prominent. In fact the report had been drawn to show the actual saving in cost by using electric welding in place of gas welding wherever it was possible to use either process. A marked divergence in cost was shown in favor of electric welding in many welding jobs. A very logical reason was presented in the discussion that showed why manufacturers of electric welding equipment could not afford to push the sale of their equipment by maintaining electric welding experts in the field in the same way the gas welding companies do. It was pointed out that the profit from the welding machine was small and in no way comparable with the continuous profit derived from the sale of gas used in the gas welding process. As an example of one of the economies effected by the use of an electric welding machine, the cutting up of old steel cars was cited. It was found that one man and a helper with a heavy electric arc could cut off and back out about 1,400 rivets in an eight-hour day. This is more than double what three men can do with a pneumatic gun and moreover the work is accomplished without injury to the steel plate.

The report on self-propelled cars was the next presented. This is the first time that the association has had a committee working on this subject. Much of the subject matter in the report was drawn from the operation of cars on various parts of the Canadian National Railways. All types of self-



propelled cars were mentioned in the report. In the discussion which followed the fact was clearly brought out that the success or failure of such cars was largely a matter of the care the equipment received in its operation and maintenance. In some cases where storage battery cars were introduced they were at first looked upon with suspicion.

This apparent disfavor was eventually overcome by having a man appointed to look after the cars and see that they were properly taken care of. This man was enthusiastic about the cars and at the same time a good mixer. The result was that after a time he managed to impart his enthusiasm to others and where once the cars were looked upon with disfavor they became very popular. It was evident enough that self-propelled cars can be operated very successfully provided they receive the proper treatment. They cannot be used as locomotives, however, and whenever an attempt is made to press them into such service they break down and may then unjustly be designated as failures.

#### Friday Session

The report on train lighting equipment and practice emphasized two features of axle lighting apparatus which have always been a source of expense, annoyance and discussion—namely, axle pulley bushings and axle pulleys. The committee recommended a material reduction in the number of axle bushings. In regard to the matter of wide faced or so-called barrel type pulleys the conclusion drawn by the committee was that this type of pulley was not as productive of increased belt mileage as was at one time believed. The fact is that where cars are operated in service where they have no serious curves to contend with, there is little difference in belt performance between the standard 10-in. face pulley and the barrel type pulley. In four or five yards, however, having extremely short curves this latter type of pulley has been responsible for a very material reduction in belt losses.

The second report presented at the final session was the longest report of the convention and covered the subject of radio communication on moving trains. Inasmuch as this was its first report on the subject the committee felt that it should go into considerable detail. A large amount of data was furnished showing what had already been accomplished. While it was apparent that in its present form the use of radio to moving trains was very much restricted there is every reason to believe that with the advent of simple, inexpensive and reliable equipment its use will become more general. A demonstration showing how the printing telegraph can be adapted to radio communication was staged in the convention hall. Through suitable receiving equipment the incoming signals from a transmitting station five miles distant were transformed into printed words upon a paper tape at

the rate of 26 words per minute. It was stated that under favorable conditions this speed could be increased to 40 words per minute. Successful tests of this machine have been carried on for several hours between Washington, D. C., and San Diego, Cal., with the machine operating at 60 words per minute. It is far too early to predict what applications may be made of radio in connection with moving trains for this new art of communication is advancing with marvelous rapidity. It will be very singular indeed if future developments do not render it a commonplace adjunct to railroad life.

The report on electric headlights was more technical in its nature than any of the others and dealt to a large extent with photometry of headlights, interchangeability of glass reflectors, alternating current headlight generators and generator bearings. The bulk of the discussion was carried on by representatives of the various manufacturers.

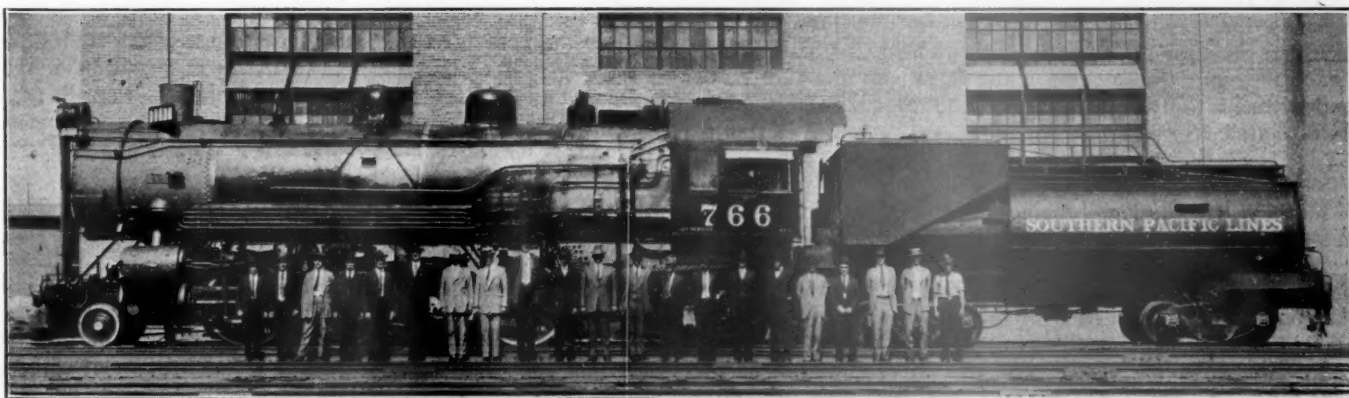
The final report of the convention touched upon a subject which is destined to receive no small amount of attention within the next year or so—namely automatic train control. Up to date only a very few of the electrical engineers have been called upon to go into this subject but it is undeniably one which is certain to engross their attention in the future. The report stated that one of the most important factors in automatic train control operation is the co-ordination of the various departments concerned. In the view of the committee some arrangement must be evolved between the mechanical, electrical and signal forces to insure the proper operation and maintenance of the system. At least 49 roads must have one division equipped with some approved form of train control not later than January 1, 1925, according to the order of the Interstate Commerce Commission.

#### Incoming A. R. E. E. Officers

The following officers for the Association of Railway Electrical Engineers were elected to serve—Ernest Lunn, Pullman Company, president; F. J. Hill, Michigan Central Railroad, first vice-president; E. Wanamaker, Chicago, Rock Island & Pacific Railroad, second vice-president. George Shirk, Chicago & Great Western Railway, and J. L. Minick of the Pennsylvania System were elected as members of the executive committee.

#### Officers of the R. E. S. M. A.

The officers elected for the Railway Electrical Supply Manufacturers Association are as follows—R. L. McClellan, Westinghouse Electric & Manufacturing Co., New York, president; George H. Scott, Safety Car Heating & Lighting Co., Chicago, senior vice-president; E. A. Lundy, Railway Electrical Engineer, Cleveland, junior vice-president; J. Scribner, General Electric Company, Chicago, secretary, and Ed. Wray, Purchases & Stores, Chicago, treasurer.



**Mikado Locomotive Given Class 2 Repairs, Including a New Firebox, New Flues and General Machinery Repairs, in 72 Working Hours at the El Paso Shop of the Southern Pacific. Master Mechanic W. Bleick and His Staff Standing by the Locomotive**

# November Meeting of Signal Section in New York

## Economics of Signaling and Highway Crossing Protection Were Major Subjects Considered

**T**HE THIRTEENTH MEETING of the Signal section of the American Railway Association was called to order by B. T. Anderson, superintendent of signals, Chesapeake & Ohio, chairman, at 10 a. m., November 14, at the Hotel Pennsylvania, New York, with 375 in attendance. After the preliminary business was disposed of and before the committee reports were presented for discussion, Mr. Anderson read a communication from R. H. Aishton, president of the American Railway Association, in which he commented on the work being done by the Signal section.

### Mr. Aishton Compliments Section's Work

Mr. Aishton said in part: "What I want to convey to you is the importance of the work that has been done by the Signal section since its organization in 1895 as the Railway Signaling Club, and during all of its progress since that time, which has been on the lines as incorporated in the constitution of the original organization for the advancement of knowledge pertaining to the principles, design, construction, maintenance and operation of railway signaling appliances, by discussion, investigation and reports of the experience of its members; and to provide a means for the exchange of ideas to the end that signaling practice may be systematized and improved."

"I don't need to refer to what you have done in the past. The present state of the signaling art is a sufficient record of the thoroughness with which you have performed your work and the progress made in uniformity, both in systems and in appliances, especially since 1910, has marked one of the most distinct steps in progress in the transportation field."

"You are considering a number of important matters at your meeting. I note particularly the progress that has been made by your Chemical Committee in the development of long-time burning oil and the interest that is manifested by the railroads in the work of this committee. The study you are giving to highway crossing protection and the standardization of that kind of work cannot help but prove to be most useful and valuable. The more recent development you are investigating as to the elimination of train stops by the use of power switch machines for operating switches from a distance and the remarkable study that is made public by you as to the result of the installation of such power switching machines offers a new avenue for increasing the adequacy of transportation about which we hear so much nowadays, and also for providing greater measures of economy in operation. These are real accomplishments and indicate the enthusiasm and the desire for improvement that has permeated the Signal section since its inception 28 years ago."

### The Metric System

F. B. Wiegand, signal engineer, New York Central, Lines West, said that under date of August 24, some documents were transmitted to the general committee relating to the propaganda fostered by various interests having for its object the compulsory introduction of the metric system of weights and measures. The engineering division is on record as being opposed to the metric system. At the meeting of the general committee, a resolution was passed recommending that the importance of this subject be called to the attention of the board of directors and to the determined efforts being made to have this legislation enacted at the ensuing session

of Congress. The Signal section went on record as opposed to the compulsory use of the metric system.

### Recommend Abolishment of Derails

The Committee on Signaling Practice, in its report, recommended that derails should not be used on main tracks; and that on heavy grades where the need of some device to check run-away trains or cars is indicated, properly designed deflecting tracks may be used. There was but little discussion of this report and it was approved for presentation at the annual meeting.

### Economics of Signaling

The report of the Committee I—Economics of Railway Signaling, included an extensive explanation of the economies accomplished by operating outlying switches by electric switch machines which are controlled remotely from the nearest telegraph office. On 16 roads these remote controlled switch machine layouts are reported as making an average net saving of \$6,386 a year for each installation or a total net saving of \$523,663 a year. The average cost of these installations was \$6,148, therefore, the net saving is over 100 per cent on the original investment every year. An outline of this committee's work was published on page 806 of the *Railway Age* of November 3.

In the discussion on this report W. F. Follett (N. Y., N. H., & H.) a member of the committee said:

"There are two points to be emphasized: 1. The monetary value of the investment. 2. The point where it becomes economically advantageous to invest."

"The monetary value of an investment for operation of an outlying switch is dependent upon the cost of the time of the train service and the cost of fuel. The factors that enter into the cost of time of the train service are wages, the efficiency of labor and train schedule. The factors governing the cost of fuel are physical and climatic. The point where it becomes economically advantageous to operate an outlying switch is that point where the cost of time and fuel balance the cost of investment and operation necessary to establish a route in anticipation of a train's arrival. It is therefore obvious that each proposed location should be a matter of individual study. We must establish the fact that the cost of stopping and starting trains is sufficient to pay all of the fixed and operating charges accruing from the proposed installation."

"For the sake of discussion, the committee has submitted four schemes for operating the switch in anticipation of the train. From the data in the report it will be seen that the first cost or investment cost increases as the operating and fixed charge cost decreases."

"It is interesting to note that the total annual costs for schemes 2, 3, 4 and 5 are respectively 30.7, 178, 98.5 and 21.4 per cent of the total first cost, while the average train stop eliminated per day by use of remotely operated switches, based upon reports from the various railroads to date, is 7.8. The Committee has conservatively estimated upon five stops a day and has made preliminary estimates valuing the cost of each stop at four dollars. Thus the estimated annual cost of Scheme 1 as indicated by tabulated reports from the various railroads, amounts to \$7,300. It is therefore interesting to note that at the average location, the economic advantage of an electrically operated outlying switch would amount to a



net profit over and above the estimated annual cost as shown by scheme 5, of more than \$5,000.

"By the law of averages this would indicate a tremendous saving. This contention is definitely confirmed by information from the various railroads presented in tabulated form in your Committee's report."

The secretary distributed copies of a revised report showing data from 17 roads instead of 16 as shown in our report, November 3; another additional road makes the average number of stops saved, on all the roads, per installation per day, to 6.04; average minutes per stop 14.5.

G. S. Pfisterer, vice-chairman of the committee, explaining the detailed tables said:

"The committee is of the opinion that the 17 railways shown in the tables do not include all that are using remotely operated power switch machines. It is believed, however, that the figures that have been furnished for the 84 installations are conservative and understate rather than overstate the savings.

"The total number of train stops eliminated per year as reported by the 17 railways is 240,024. The average time saved per stop is 13.24 minutes. The time saved per year through the elimination of train stops is 52,971 train hours. This number of hours represents the *continuous* operation of a freight train for six years. This alone is an item of no small importance.

"No attempt has been made to arrive at an average value per hour as the values reported in some cases seem to be entirely too low. Railway 16 reports a value per hour of \$19.18. This checks with the cost of a freight train hour for the railways of the United States for 1922, which is given as \$19.19. This cost includes the following accounts: Locomotive repairs, engine house expenses, engine men, train men, fuel and other locomotive and train supplies. It does not, however, include the *total* cost of operating a freight train per hour, as a number of items, including overhead, are omitted. The items that are included are commonly called "out of pocket costs" and represent the items that are directly effected by increased efficiency of operation. This item of \$19.18 includes fuel; and it will be noted that the saving for railway 16 is arrived at by multiplying the hours saved per year by \$19.18, giving a total of \$22,402.

"This question of the cost of a freight train hour is being considered by the committee, and it is hoped that a detailed report will be made at the annual meeting in March.

"The saving in coal ranges from 150 to 1,400 pounds per stop, with an average of 664 lb. The 1,400 lb. per stop is the amount of coal consumed in stopping and starting tonnage trains on heavy grades, or where the trains require pusher engines. The saving in labor of 70 men is largely accounted for by the use of the power switch machines in consolidating interlocking stations.

"The total cost of coal saved, \$319,861, less \$17,000 for supplies (Railway 11) gives a total of \$302,861, which amount, divided by the number of stops, 240,024, shows that the cost for coal per stop is \$1.26. This is an important figure as it shows that the cost of a train stop for coal *alone* is \$1.26.

"The gross value of the saving per year is given as \$633,645. Deducting annual charges of \$63,520, gives a total net amount saved per year of \$570,125, and this is for only 17 railways."

Mr. Pfisterer gave additional details concerning the installation on a number of roads, particularly the road entered as "No. 6" in the table but he gave no names of roads.

T. S. Stevens (A. T. & S. F.) called upon the committee to go further, and report at a future meeting on the use of spring switches which would make additional savings. The spring switch with the oil buffer, is now a safe device. A certain road, shown in the report has made a given saving at a draw bridge. The Santa Fe would manage the gauntlet

at that bridge with spring switches, and make further savings.

Colonel Azel Ames commended the committee highly for the large amount of useful information given in the report. While the statements from many of the roads leave interesting details yet to be given, the report, nevertheless, affords a splendid basis for further discussion. Some of the data shows variations of hundreds of per cent as between one road and another; but this, it must be remembered, in such an elusive matter, is much better than variations of thousands of per cent.

George M. Basford, being called upon, complimented the committee in equally strong terms. "At last," said Mr. Basford, "this Section has made a report on which an operating officer can make a definite recommendation for an appropriation. Send this report to the proper committee of the American Railway Association and tell them to use it in their campaign to increase the movement of freight cars in miles per day."

W. H. Elliott (N. Y. C.) calling attention to the varied results shown in the table, observed that no doubt this is to be explained in part by the fact that some roads have installed more elaborate apparatus than have others. It is very desirable that the committee make a further study of the layouts on different roads so as to be able to explain the economies more in detail. Some roads are subject to criticism at times for extravagant expenditures in this direction while others perhaps receive undue credit for savings by installations which are not as complete as they should be.

#### Report on Highway Crossing Protection

Important requisites for the construction and operation of highway crossing signals were submitted by the special committee assigned to this subject. Requisites for the flashing light type of crossing signals state that the signal is to consist of two lamps spaced 2 ft. 6 in. centers mounted on the standard crossing sign from 6 ft. to 9 ft. from the ground. These lamps are flashed alternately from 30 to 45 times a minute for a period of at least 20 seconds before the arrival of a train at the crossing. The lamps at normal voltage must be visible at a minimum of 300 ft. under adverse conditions of a bright sun shining into the lens. For the wig-wag type of signal the new standard banner is 22 in. in diameter painted white with a black cross and black ring at the edge. A light in the center is to be illuminated when the banner swings.

#### Discussion

From experiments conducted by the committee, it appears that perhaps the 8 $\frac{3}{8}$  in. roundel or lens will prove to be better for use with the flashing light type of signal. The dimension of the roundel or lens used in the standard banner was eliminated by the committee leaving it optional with a company to use a size between the minimum and maximum specified. There was some discussion as to whether the committee would consider other than automatic forms of protection for crossings, but the chairman stated that the committee was confining its work to the assignments given it.

#### Reports of Other Committees

Committee VIII—Alternating Current Signaling, presented a report on the application of rectifiers, and stated that mechanical rectifiers are used successfully on a charging rate of up to 1,000 m.a. at 2 volts to 20 volts and that above this rate the gas-filled hot cathode rectifiers were recommended. The advantages of the a.c. floating battery method of charging storage battery used for signaling were set forth. The committee also reported that as yet no device without moving parts is available as a substitute for relays.

*Discussion.*—The report of this committee, after brief discussion was, at the request of the committee, referred back for the inclusion of additional matter.

Committee VI—Designs, presented revised drawings of five standard designs and six new standards and also a proposed revision in the specification for 1 in. wrought-iron pipe. The special committee appointed to confer with the Mechanical Division, A. R. A., with reference to the destruction caused to signal equipment by salt brine drippings from refrigerator cars, reported that the Rule 3 (f) of Rules of Interchange issued by the Mechanical Division will be in full effect after January 1, 1924, reading as follows:

After January 1, 1924, no car carrying products which require for their refrigeration the use of salt with ice and which are equipped with brine tanks will be accepted in interchange unless provided with suitable device for retaining the brine between icing stations.

*Discussion.*—Of the standards, Plate 34, standard symbols, after brief discussion, and a slight change under the head of highway crossings, was approved for presentation to the annual meeting. Plate 1056 (page 46) was likewise accepted after the addition of one detail. Drawing 1085 was accepted without discussion and 1223 after brief discussion. Drawing 1236 was withdrawn by the committee, as was 1550. No. 1544 was revised and accepted, and 1545, 1548, 1552 and 1556 were accepted without discussion.

This committee's report on electric lamps for signals was accepted as information, and its changes in the specification for wrought iron signal pipe were approved for presentation at the annual meeting. Its report on damage to signal equipment by salt brine dripping from refrigerator cars (a subcommittee report by B. H. Mann) was accepted as information, this action being understood as approval of stiffening the car-interchange rule authorizing rejection of dripping cars.

Committee IX—Overhead and Underground Lines, is investigating several methods of improving tapes and braid for insulated wires and means for dead ending wires on cross-arms. A special report recommended the revision of the National Electrical Safety Code to permit circuits used in connection with railway signaling for 440-volts to be run in a position occupied by other signal circuits on the pole line.

Committee V—Instructions, submitted complete sets of instructions for the installation, maintenance and operation of various types and sizes of storage batteries used for signaling. Instructions for the handling of insulated wire and for mak-

ing measurements of the insulation resistance were also submitted, as were recommendations for the revision of train-operating rules for signal indications. A detailed chart showing the proper signal aspects with indication and name was a part of the report.

*Discussion.*—The 14 pages of instructions for installation, maintenance and operation of storage batteries were discussed at length, many members asking questions and proposing modified wording, and the committee itself making some additions; and this part of the report was recommitted for revision prior to the March meeting.

This committee's proposed code of rules for handling insulated wires and cables was discussed at some length and a number of clauses revised. It was then approved for presentation at the annual meeting. The same was true of the code of instructions for making measurements of insulation resistance.

Drawing No. 1378, scale range for d.c. volt-ammeters, was adopted.

Committee II—Mechanical Interlocking, presented specifications for electro-mechanical interlocking machine, unit electric levers.

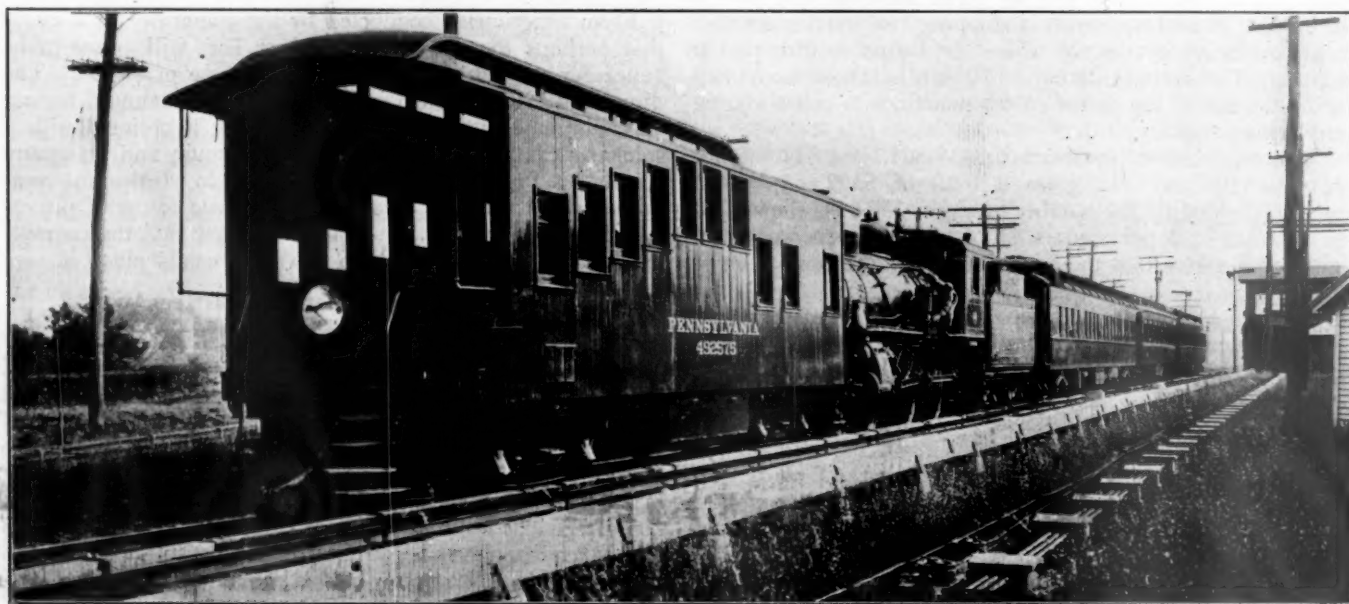
Instructive directions for testing the train shunt resistance and for testing switch circuit controller contacts formed an interesting and valuable part of the report of Committee IV—D. C. Automatic Block Signaling. However, the report included also complete specifications for low voltage d. c. block signals.

The report of Committee XI—Chemicals, included specifications for motor gasoline and reports on lubricants and liquid fuels as well as the result of burning tests on samples of long-time burning oil.

Committee VII—In order that the valuation records may be maintained properly the Committee has prepared instructions for field forces and for the use of forms, and gives complete information required to maintain records.

### Meetings Next Year

The secretary announced that the annual meeting of the Section would be held at Drake Hotel, Chicago, on March 13 and 14, 1924; and the next "stated meeting" will be held in the week beginning September 22, 1924, at Ocean View Hotel, Swampscott, Mass., which is on the Boston & Maine, 12 miles from Boston.



An Inspection Train on the Long Island



## General News Department

General Charles G. Dawes will address the Western Railway Club at its November meeting, which will be held at the Auditorium Hotel, Chicago, Monday evening, November 19.

Shopcrafts employees of the Chicago, Burlington & Quincy have been granted an increase in wages of two cents an hour, following a series of conferences between officers of the road and representatives of the shop workers. The increase will affect some 18,000 men of all classes in the shops and will add approximately \$1,000,000 per year to the payroll of the road.

The Interstate Commerce Commission has announced that oral arguments on its plan for the consolidation of the railroads will be heard at Washington beginning on January 7. All desiring to be heard at that time should advise the commission by December 20, if possible, and briefs must be filed before the date set. Final argument on the commission's tentative consolidation plan will be presented at a hearing at Washington beginning on November 16.

### Assigned Car Order Again Postponed

The Interstate Commerce Commission has again postponed the effective date of its order in the assigned car case from December 1 to January 1.

### Highway Crossing Laws

Since the publication of the table printed in the *Railway Age* of November 3, containing data relative to laws regulating the passage of automobiles across railroads, the following items have been received:

Idaho, by a law of 1921, requires the speed of motor vehicles, within 150 ft. of a crossing outside of the boundaries of municipal corporations, to be limited to 15 miles an hour.

Massachusetts, by a law of 1917, limits the speed of motor vehicles to "a reasonable and proper rate" approaching any railroad crossing; penalty for violation \$10 to \$50.

Missouri reports having no law on this subject.

### Railroad Labor Organizations Urge

#### Reappointment of Commissioner McManamy

Officers of the 16 principal railroad labor organizations began a meeting at Washington on November 14 for the purpose of considering the program of railroad legislation they will advocate at the coming session of Congress. A committee consisting of D. B. Robertson, president of the Brotherhood of Locomotive Firemen and Enginemen; L. E. Sheppard, president of the Order of Railroad Conductors; E. J. Manion, president of the Order of Railroad Telegraphers; W. H. Johnston, president of the International Association of Machinists, and Timothy Healy, president of the International Brotherhood of Firemen and Oilers, called on President Coolidge at the White House to urge the reappointment of Frank McManamy as a member of the Interstate Commerce Commission. Mr. McManamy was given a recess appointment by President Harding for the remainder of the term of Commissioner Daniels, resigned, which expires at the end of the year.

### Coal Investigation Broadened to Include Bituminous

The Interstate Commerce Commission has issued an order broadening the scope of the investigation which it has under way into the rates, charges, practice, etc., governing the transportation of anthracite coal, to include the transportation of bituminous coal, semi-bituminous coal and coke from points in Virginia, West Virginia, Kentucky, Ohio and Pennsylvania to points in the New England states and New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and the District of Columbia. The proceeding, in so far as it relates to

bituminous coal, was assigned for hearing at Washington on December 3 before Examiner Butler. The order states that it appears that the scope of the inquiry should be enlarged in order that the commission may elicit information sufficient to enable it to take appropriate action to require the establishment of railway routes and reasonable rates that will insure transportation of an adequate supply of fuel for domestic and other purposes, and refers to complaints of shortage of fuel in the states of destination named.

### Oklahoma Commission Approves

#### Railways' Physical Condition

Efforts of shopcrafts employees on several lines in Oklahoma to secure the appointment of inspectors to investigate and report on the physical condition of the roads in the southwest territory proved unsuccessful when the Oklahoma Corporation Commission declared that no necessity exists for such appointments and that the complaint was obviously based on misinformation. The submission which was brought against the roads by the defeated shopcrafts strikers was presented to the Oklahoma commission on August 6 by O. E. Heath, an officer of the railway employees' department of the American Federation of Labor. The Chicago, Rock Island & Pacific and the Arkansas Western were particularly charged with "employing in the transportation of passengers and freight, engines and cars with such defects as to imperil the safety of passengers and employees." The Oklahoma commission found "that the motive power and rolling stock of the railroads in Oklahoma are at this time in as good if not better condition than at any period in the history of the railroads. The report of the commission also pointed out that freight traffic had been expedited in 1923, that the cars furnished had been in excellent condition, that claims for loss, damage and delay had been much decreased and that shippers in Oklahoma had not suffered from any car shortage.

### Hal S. Ray Addresses Chicago Car Foremen

The Car Foremen's Association of Chicago held its regular monthly meeting Monday evening, November 13, at the Great Northern Hotel, Chicago, the principal address, which was in the nature of an inspirational talk, being by Hal S. Ray, director of public and personnel relations of the Chicago, Rock Island & Pacific. Mr. Ray commented briefly on railroad public relations work, stating that the public and the railroads are economic partners, and that anything which is harmful for one indirectly harms the other. The weakness of the position which some farmers take in maintaining that high freight rates are responsible for the low price of wheat was illustrated by the fact that while the price of wheat has gone down, the price of corn has gone up. Obviously, freight rates cannot be responsible for both price tendencies, and as a matter of fact they are responsible for neither.

The main part of Mr. Ray's talk was devoted to the railroad foreman and his responsibility in interpreting management ideals and policies to his men. Regarding this subject, Mr. Ray said in substance: "Railroad officers are honest in advocating the square deal to their employees. They are honest, if for no other reason, because it is the best policy. The day of 'bunk' and 'bluff' in railroading has long since passed, experience having repeatedly demonstrated that the only way to secure results with men is by treating them fairly. It is the duty of foremen to overcome the suspicion with which employees from long habit regard all improvement and betterment plans emanating from the management.

"The rank and file of railroad foremen do not realize the importance of their jobs and the big opportunity which they have to be of inestimable service by creating a better understanding between the managements and the men. Foremen are the channels through which right can be made wrong, and wrong can be made right. The best plans developed by the managements can be made

non-effective by the way in which they are interpreted to the workmen, and on the other hand, workmen will be slow to think ill of any railroad which is fortunate in employing able, conscientious foremen. Most railroad foremen are always on the job, efficient, dependable, but entirely too modest and unassuming, with the result that the importance of their work is not always appreciated. It is the foreman's duty to be consistently hopeful and helpful in dealing with his men, always endeavoring as far as may be possible to give each man work to which he is fitted and which he can enjoy. No part of the foreman's work is more important than to encourage and help the men who work under him. When questions are asked regarding various phases of the work, courteous, brief and informative answers should be given. Don't answer a question with a lot of conversation which doesn't mean anything. Another essential is to convey to workmen an understanding of the importance of their work and an appreciation of the vital link which they form in the railroad chain."

### Locomotive Development Shown in Great Northern Exhibit

Two locomotives which illustrate graphically the developments in motive power which have been made during the last half century are being sent over the line of the Great Northern for exhibition purposes at various points. They are the "William



The "William Crooks," First Locomotive in Minnesota, Standing Beside a New Great Northern Engine

Crooks No. 1," which was the first engine brought into the state of Minnesota and which arrived on a river barge in 1861, and passenger locomotive No. 2500 which represents the latest type for passenger service. In connection with the exhibition, the Great Northern is offering a prize of \$10 for the best amateur photograph of the two engines. More than 500 snapshots were taken at Grand Forks, N. D., Devils Lake and Minot, the points which have already been visited. The accompanying photograph shows the two locomotives at St. Paul, Minn., before they were started on their journey to the Pacific coast.

### Reading and Jersey Central Entertain Three-Hours-for-Lunch Club

The Three-Hours-for-Lunch Club, an organization of literary men in New York, recently made a pilgrimage to Philadelphia to foster more cordial relations between writers in the two cities. Hearing that the trip was planned the Central of New Jersey and the Philadelphia & Reading placed a private car at the disposal of the club and officers of the traffic departments of both roads acted as guides for the party. Captain David Bone, a well-known Scottish writer and master of the transatlantic liner, Tuscania, was the club's guest of honor. The pilgrimage was described by Christopher Morley in the New York Evening Post in part as follows:

"It will not be necessary to explain to 'kinsprits' that the journey was made, as journeys to Philly always should be made, by the New Jersey Central-Reading route. It is true that gratitude may here mingle with single-minded devotion to truth; for the New Jersey Central, having heard of the Club's ambition to mingle with Philadelphia, had placed a Private Car at their disposal. But our preference for the New Jersey Central transit has long ago been made public. The journey was made almost in an ecstasy of contentment by the members. It was felt that the kindness of the railroad company should be reciprocated with every delicacy; accordingly a judicious wale of the Club's members had been made; nine gentlemen (the number of the Muses) of the very best breeding and accomplishments, were of the party; men

who would never betray in their manner that they had not been accustomed to private cars. It is true that Capt. Bob Bartlett, on first looking round the vehicle, ejaculated something to the effect that this would be a pleasanter way to go to the North Pole; but Bob was promptly suppressed. In the company were several, particularly Mr. B. D. Branch and Mr. Tosh of the New Jersey Central, and Mr. Osterhout of the Reading, acting as transportation hosts, who knew every inch of that charming and pensive tract of scenery. Dr. Canby, the highly cultured editor of the Literary Review, was also eager to expound his ancestral associations with the Huntingdon Valley, and Capt. Bone, who was not allowed to miss anything, was kept busy zigzagging his seamanly gaze from port to starboard and back again.

"At the Reading Terminal a surprise awaited the Club. Mr. Lewis, passenger traffic manager of the Reading, instructed the members to wait outside the car until the Welcoming Committee arrived. Far down the long vista of platform a shrill yammering was heard; two gigantic pipers in Highland garb came marching; between them, wearing a glimmering plug hat and a face of appalling solemnity, was Mr. Thomas Augustine Daly, the poet. Mr. Daly ceremoniously greeted Capt. Bone; words of gentlemanly politeness were uttered and responded to; Mr. Daly then handed his silken topgallant to an assistant, and resumed his agreeable existence as Tom. The company fell in line in pairs; preceded by the exhalations of the pipes the small procession marched solemnly down Market Street. \* \* \* \*

"It had been the suggestion of the railroad company that on the return trip some of the members ride in the cab of the locomotive. Great curiosity was felt as to how the three Skippers, Capts. Bone, Bartlett, and Riesenbergs, would navigate what Bob Bartlett handsomely described as the Iron Steed. But other members, a little fainthearted, vetoed this idea. So, calmly reviewing the ardors and excitements of this Day, the Club returned as it came, in its vehicle of privacy, to the ferry named Liberty Street. This was a day on Liberty Street, and it is not to be forgotten. \* \* \* \*

### Birthday of Professor Joseph Henry

At the New York State museum, at Albany, preparations are being made for celebrating, on Monday, December 17, the 124th anniversary of the birth of Professor Joseph Henry, inventor of the electro-magnet; and a main feature of the celebration will be the broadcasting from the radio stations at Schenectady (WGY) and Troy (WHAZ) of brief addresses, sketching Professor Henry's career, together with the sound of the ringing of the small bell (now in the museum) which Henry used in his electrical experiments.



J. Henry

As a principal element in the apparatus of the Morse telegraph and as the most essential element in the apparatus for automatic block signaling, which now protects all of the trains on over 40,000 miles of American railroads, the electro-magnet possesses a unique importance; and readers of the *Railway Age* will need no urging to join in paying due respect to the memory of its inventor.

Joseph Henry was born in Albany on December 17, 1799, and became professor of mathematics in the Albany Academy in 1826. It was here, in 1831, that he performed the experiments which developed the electro-magnet. The first crude result was the ringing of a bell, at the farther end of a wire one mile long suspended in one of the large rooms of Albany Academy. He made numerous other important discoveries and inventions in chemistry and physics. Later, he was professor of natural philosophy at Princeton; and in 1846 was chosen the first secretary of the Smithsonian Institution at Washington. Here he continued until his death, in Washington, on May 13, 1878.

The radio stations mentioned above both send 380-meter waves.



## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1923

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals 1922.
		Freight.	Passenger.	Total (inc. misc.).	Maintenance of way and structures.	Equip-ment.	Traffic.	Trans-portion.					
Akron, Canton & Youngstown.....	170	\$216,369	\$984	\$225,575	\$33,016	\$26,883	\$10,218	\$67,925	\$9,992	65.60	\$77,558	\$63,363	\$28,311
Albany & Vicksburg.....	170	1,927,552	8,576	2,016,001	299,927	195,358	75,998	603,262	1,256,420	62.30	759,581	326,420	346,020
Albany & Vicksburg.....	141	210,708	70,209	300,217	57,470	59,492	81,525	90,130	1,164,1	76.40	1,129,518	48,448	5,493
Albany & Vicksburg.....	141	1,807,330	562,448	2,549,701	393,165	459,079	81,525	863,541	1,070,021	75.40	627,944	360,245	181,701
Vicksburg, Shreveport & Pacific.....	188	256,464	98,917	377,912	65,279	68,897	10,965	119,417	13,288	74.20	97,386	73,199	57,231
Ann Arbor.....	182	2,134,982	876,668	3,249,778	449,881	565,924	99,758	1,048,883	122,530	71.00	940,294	662,591	196,908
Ann Arbor.....	293	421,320	40,943	488,866	70,010	120,776	8,715	178,427	13,094	80.00	97,332	78,111	9,890
Ann Arbor.....	293	3,445,869	367,442	4,013,311	505,894	993,111	8,715	1,684,600	116,607	84.20	633,351	438,456	176,611
Atchison, Topeka & Santa Fe.....	8,981	11,752,553	3,002,375	17,047,540	2,526,317	4,256,404	280,013	5,108,853	332,788	73.20	4,576,314	3,043,690	3,483,064
Gulf, Colorado & Santa Fe.....	1,908	1,802,664	383,474	2,500,668	446,689	327,973	43,209	715,312	3,031,476	73.50	39,297,189	27,821,656	29,405,742
Panhandle & Santa Fe.....	858	708,311	134,993	875,632	1,006,678	1,006,678	6,960	235,076	16,652	68.60	275,148	251,412	217,775
Atlanta & West Point.....	93	127,113	73,659	233,186	35,002	31,522	8,863	83,613	10,941	83.90	97,640	70,862	46,611
Western of Alabama.....	133	1,346,801	638,692	2,190,353	292,902	411,376	89,075	689,688	101,297	73.80	573,697	455,935	436,030
Atlanta, Birmingham & Atlantic.....	639	2,729,481	454,549	3,424,657	608,004	810,652	194,370	1,688,953	139,667	96.90	11,622	—957	—2,566
Atlantic Coast Lines.....	4,860	3,782,518	1,241,436	5,487,547	855,615	1,460,962	116,897	2,048,816	12,813	84.70	841,150	390,252	1,024,367
Charleston & Western Carolina.....	342	2,469,880	333,378	2,933,203	494,859	591,784	63,225	1,194,004	59,400	82.50	50,535	34,462	18,904
Baltimore & Ohio.....	5,212	17,362,976	2,868,321	23,527,022	2,350,468	3,244,261	309,021	7,883,504	480,132	76.30	5,091,877	4,307,478	3,977,152
Baltimore & Ohio Chicago Term.....	83	160,169,747	22,880,649	195,315,973	19,913,685	49,283,965	2,904,972	71,917,087	4,342,968	75.10	14,806,369	11,323,213	11,001,744
Staten Island Rapid Transit.....	23	75,404	116,021	224,296	55,483	27,442	2,018	121,662	14,500	98.60	3,191	—11,059	—21,535
Bangor & Aroostock.....	616	450,387	71,592	546,162	81,693	189,940	4,046	155,789	18,125	77.80	112,381	17,432	—397,542
Belt Ry. of Chicago.....	32	3,973,108	665,691	4,835,343	1,013,182	1,114,944	39,421	1,556,637	162,413	80.40	5,051,858	577,603	1,007,739
Bessemer & Lake Erie.....	228	1,984,148	269,470	2,253,618	1,016,105	4,620,243	143,126	4,009,754	257,221	61.80	5,668,625	4,807,628	5,988,818
Bingham & Garfield.....	34	34,765	36,581	71,346	24,365	3,536	1,139	14,035	3,193	126.80	—9,799	—18,030	—6,771
Boston & Maine.....	2,286	4,052,507	2,216,809	6,269,316	8,956,458	14,532,835	488,945	31,167,351	1,914,761	82.40	7,820,534	5,762,669	5,126,865
Brooklyn Eastern District Terminal.....	9	102,753	108,404	211,157	8,718	20,286	41	40,102	5,071	68.50	34,186	27,660	29,120
Buffalo & Susquehanna Ry. Corp.....	253	1,974,471	4,155	1,978,626	53,888	132,762	2,850	426,395	46,474	57.40	487,757	412,345	416,045
Buffalo, Rochester & Pittsburgh.....	589	1,602,664	153,824	1,856,488	395,630	737,898	18,063	651,311	80,032	104.80	210,128	108,427	551,220
Canadian Pacific Lines in Maine.....	233	92,230	29,807	136,651	63,085	38,953	4,643	76,005	3,492	91.60	1,476,663	1,161,133	2,338,267
Carolina, Clinchfield & Ohio.....	309	689,293	49,803	752,932	84,146	234,231	24,578	203,416	19,911	75.20	186,918	137,355	202,951
Central of Georgia.....	1,920	1,354,996	463,614	2,053,567	696,899	1,974,934	225,404	1,944,195	178,388	71.40	2,009,466	1,538,297	2,079,310
Central of New Jersey.....	694	2,983,646	1,018,065	4,264,943	551,682	1,733,039	34,090	1,725,887	108,448	97.80	92,730	—159,447	—190,708
Central Vermont.....	533	4,808,938	1,005,998	6,541,119	996,890	1,129,184	114,210	3,417,829	184,667	89.40	692,245	504,931	38,641
Chesapeake & Ohio.....	2,552	7,600,579	1,119,862	9,159,030	2,028,448	2,555,533	79,655	2,880,836	172,830	76.10	1,293,471	1,661,622	1,744,371
Chicago & Alton.....	1,050	2,135,018	622,270	2,978,877	376,088	620,286	57,230	961,403	52,927	76.20	1,905,491	1,492,352	15,261,793
Chicago & Eastern Illinois.....	945	1,874,497	466,361	2,512,172	268,153	823,051	44,287	877,312	65,871	83.10	423,317	272,921	318,752
Chicago & North Western.....	8,462	8,834,931	2,808,090	14,062,408	2,352,310	2,780,126	163,866	5,375,835	339,736	78.60	3,006,063	2,248,581	1,980,028
Chicago, Burlington & Quincy.....	9,405	11,050,491	2,681,473	15,060,340	2,243,923	3,252,746	210,888	5,202,571	342,188	75.20	3,719,357	3,108,088	2,982,359
Chicago Great Western.....	1,496	1,582,286	378,670	2,147,879	333,718	477,455	63,025	864,372	51,326	80.00	344,482	17,521,975	15,899,297
Chicago Great Western.....	1,496	14,434,501	3,241,863	19,267,417	3,117,541	4,212,526	580,274	8,063,776	487,429	86.00	2,691,257	1,993,955	1,076,692

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues—Total				Operating expenses				Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals 1922.
		Freight.	Passenger.	(Inc. misc.)	Way and structure.	Traffic.	Trans- portation.	General.	Total.					
Chicago, Indianapolis & Louisville, Sept. 657	13,650	\$1,068,364	\$293,142	\$1,497,131	15,968	17,636	57,820	8,423	101,836	81.90	22,558	22,520	4,054	—38,046
Chicago, Indianapolis & Louisville, 9 mos. 657	120,661	10,333,069	2,697,131	13,030,200	164,387	191,446	567,243	80,383	1,023,836	99.10	9,221	—5,393	—176,213	—361,275
Chicago, Milwaukee & St. Paul, Sept. 11,010	11,015	95,727,077	18,447,368	127,282,894	17,918,435	29,873,548	1,821,719	50,409,109	2,820,372	81.20	23,920,997	17,191,191	12,602,078	7,981,071
Chicago, Peoria & St. Louis, Sept. 247	99,958	13,650	124,394	15,968	17,636	57,820	8,423	101,836	22,558	81.90	22,558	22,520	4,054	—38,046
Chicago River & Indiana, Sept. 19	822,269	120,661	1,033,069	164,387	191,446	567,243	80,383	1,023,836	1,023,836	99.10	9,221	—5,393	—176,213	—361,275
Chicago River & Indiana, 9 mos. 19	1,015,775	8,617,332	1,617,332	10,234,664	1,617,332	2,234,664	1,015,775	3,252,137	3,252,137	61.80	211,725	193,880	236,322	1,966,811
Chicago, Rock Island & Pacific, Sept. 7,635	5,348,334	19,905,905	92,221,471	10,959,148	86,915	13,283	194,686	15,467	374,354	73.40	2,855,029	2,457,695	2,028,420	1,448,740
Chicago, Rock Island & Gulf, Sept. 461	390,977	74,949	498,925	63,002	86,915	13,283	194,686	15,467	374,354	75.00	124,571	112,262	88,985	96,102
Chicago, St. P., Minn. & Omaha, Sept. 1,749	1,803,348	566,479	2,554,243	441,638	462,098	34,501	1,029,377	68,065	2,045,672	80.10	508,571	373,970	316,635	558,586
Cincinnati, Indianapolis & Western, Sept. 347	338,726	44,093	411,807	52,923	51,445	11,783	150,174	18,909	326,760	79.30	85,047	191,530	189,418	2,551,374
Colorado & Southern, Sept. 1,099	806,935	207,061	1,093,958	191,695	266,155	12,512	393,365	41,059	915,844	83.70	178,114	109,953	102,496	73,219
Ft. Worth & Denver City, Sept. 456	576,464	204,531	828,337	102,817	191,315	12,512	324,698	34,229	592,872	91.30	235,465	213,793	267,480	1,160,457
Wichita Valley, Sept. 271	89,187	28,637	125,059	17,031	8,144	35	43,934	1,612	70,074	73.60	1,795,446	1,425,997	1,762,583	1,842,289
Columbus & Greenville, Sept. 167	101,575	267,431	1,134,993	336,651	165,154	28,509	420,181	8,949	1,036,550	91.30	98,473	1,036,550	1,036,550	89,328
Delaware & Hudson, Sept. 886	2,710,061	460,256	3,399,069	334,832	1,039,243	46,909	1,365,466	134,955	2,942,283	86.70	456,786	361,432	348,070	1,622,569
Delaware, Lackawanna & Western, Sept. 993	4,110,407	1,421,563	6,297,225	739,508	1,587,661	107,218	2,487,730	150,681	5,285,474	82.70	6,107,180	5,329,587	4,935,238	626,901
Denver & Rio Grande Western, Sept. 2,593	2,562,136	627,405	3,483,501	699,737	813,397	50,678	1,220,904	84,029	2,916,788	83.70	566,713	413,090	395,460	559,055
Denver & Salt Lake, Sept. 255	2,205,565	23,915	280,740	46,027	83,595	995	93,925	5,873	246,415	90.60	2,171,312	816,682	1,443,060	4,904,954
Detroit & Mackinac, Sept. 375	121,728	27,406	162,485	41,294	46,245	2,058	58,247	5,828	153,392	94.40	9,093	—510	5,113	47,513
Detroit & Toledo Shore Line, Sept. 61	358,811	1,015,775	1,411,222	1,411,222	1,411,222	1,411,222	1,411,222	1,411,222	1,411,222	97.30	38,103	37,177	37,177	37,177
Detroit, Toledo & Ironton, Sept. 454	916,183	10,284	141,252	96,877	6,634	241,489	24,742	50,690	372,180	58.50	390,562	372,180	211,227	383,097
Duluth & Iron Range, Sept. 279	5,603,913	163,679	6,293,941	885,582	1,170,274	11,329	1,908,441	169,372	4,148,832	65.90	2,145,109	1,680,688	1,715,489	1,767,246
Duluth, Missabe & Northern, Sept. 304	3,241,707	14,302	3,514,011	195,604	195,916	3,536	328,879	23,634	948,283	27.00	2,365,728	2,257,356	2,253,006	1,179,936
Duluth, South Shore & Atlantic, Sept. 591	379,315	113,931	561,702	81,186	75,671	7,229	202,106	13,221	385,387	68.60	176,315	148,315	132,151	57,725
Duluth, Winnipeg & Pacific, Sept. 178	128,473	22,175	156,027	34,904	44,104	57,130	2,070,855	107,325	3,567,235	79.80	901,461	643,333	475,162	—15,023
Elgin, Joliet & Eastern, Sept. 459	1,913,922	7,069,464	202,085	1,817,990	320,598	388,408	776,960	40,538	1,585,701	87.20	232,389	66,053	52,668	—27,050
El Paso & Southwestern, Sept. 1,139	747,560	143,749	941,349	160,852	179,858	31,265	243,180	39,918	663,728	70.50	277,621	170,878	150,276	279,405
Erie, Sept. 2,039	6,605,695	1,289,377	8,629,373	1,284,257	2,424,299	143,929	3,226,778	274,342	7,340,211	85.10	1,289,162	938,391	1,194,315	1,496,974
Chicago & Erie, Sept. 269	1,261,075	84,901	1,434,259	145,633	187,606	21,779	368,955	39,608	756,723	52.80	677,336	624,845	293,734	293,935
New Jersey & New York, Sept. 45	19,801	139,074	15,615	18,730	1,585	62,709	3,870	102,509	72,973	69.30	3,226,619	3,233,335	3,549	1,319,088
New York, Susq. & Western, Sept. 135	203,845	70,812	308,034	58,783	89,247	3,814	188,284	11,530	321,658	114.20	43,624	—74,724	—77,119	—27,079
Evansville, Ind. & Terre Haute, Sept. 137	637,737	569,469	3,642,788	492,719	688,937	32,630	2,006,463	108,113	3,287,764	91.40	313,912	70,724	4,861	—28,854
Florida East Coast, Sept. 764	548,304	227,824	889,638	252,532	228,357	12,045	320,382	29,469	851,134	95.70	38,504	—84,892	—126,075	—135,245
Fort Smith & Western, Sept. 249	100,557	3,568,892	11,972,399	1,682,908	1,862,837	120,774	3,599,965	268,655	7,640,592	63.80	4,331,807	3,407,708	2,825,091	2,176,401
Galveston Wharf Co., Sept. 13	355,136	114,337	504,031	91,063	34,718	22,588	196,869	20,478	386,628	76.70	117,403	111,120	97,848	56,437
Georgia R. R., Sept. 328	3,289,901	977,867	4,537,269	491,099	860,499	188,341	1,893,163	178,735	3,611,972	79.30	945,297	885,578	806,163	476,802



## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals 1922.
		Freight.	Passenger.	Total (inc. misc.).	Maintenance of way and structures.	Equip-ment.	Traffic.							
Georgia & Florida.....	Sept. 405	\$116,493	\$23,142	\$139,635	\$20,775	\$21,032	\$8,736	\$7,821	\$116,045	77.00	\$34,737	\$28,435	\$19,184	\$16,437
Grand Trunk Western.....	Sept. 405	1,042,450	180,615	1,223,065	164,896	170,518	75,855	65,782	1,006,952	77.30	295,487	238,103	154,725	138,133
Atlantic & St. Lawrence.....	Sept. 405	1,331,681	228,914	1,560,595	211,312	217,172	51,910	52,787	1,163,661	69.80	503,562	439,859	219,698	141,887
Chic., Det. & Can. Gr. Tr. Jct.....	Sept. 347	12,381,526	1,794,316	14,175,842	1,400,833	2,905,289	333,101	5,405,370	10,550,103	69.50	4,532,406	3,997,401	1,682,107	475,562
Det., Grand Haven & Milwaukee.....	Sept. 166	150,164	44,100	194,264	101,886	153,539	2,035	124,475	253,553	117.12	-37,061	-52,214	106,328	-73,629
Great Northern.....	Sept. 166	1,008,016	298,304	1,306,320	677,322	477,528	42,093	1,530,358	77,873	119.91	-467,889	-604,095	-1,416,404	-73,854
Green Bay & Western.....	Sept. 59	203,952	14,136	218,088	133,769	142,721	5,845	82,242	285,809	54.70	115,878	107,676	86,564	107,676
Gulf Coast Lines.....	Sept. 59	2,185,883	87,044	2,272,927	164,572	159,828	37,083	778,410	3,051,338	45.30	1,418,773	1,334,891	1,084,219	482,919
Gulf, Mobile & Northern.....	Sept. 189	472,776	48,064	520,840	64,804	55,840	14,973	201,108	413,666	71.00	168,766	166,167	78,859	16,573
Hocking Valley.....	Sept. 189	4,238,269	389,611	4,627,880	662,326	610,714	94,228	2,348,326	3,983,896	75.70	1,243,004	1,207,470	428,385	261,639
Illinois Central.....	Sept. 8,252	9,382,951	1,423,956	10,806,907	1,377,872	1,870,367	117,964	3,466,315	2,364,300	62.10	4,438,925	3,559,915	3,508,200	1,836,120
Yazoo & Mississippi Valley.....	Sept. 8,252	65,475,468	11,622,269	77,097,737	12,277,658	17,058,798	1,372,302	33,800,013	1,900,147	78.10	18,715,710	12,942,506	13,275,167	10,084,242
Ill. Cent. & Yazoo & Miss. Valley.....	Sept. 234	88,686	9,687	98,373	16,723	28,543	2,320	51,105	101,417	95.90	4,290	-3,710	-4,369	9,268
International & Great Northern.....	Sept. 234	774,405	124,410	898,815	166,753	213,823	21,896	406,423	24,694	83.60	139,878	67,502	87,979	130,923
Kansas City, Mexico & Orient.....	Sept. 234	4,406,435	848,417	5,254,852	159,146	134,209	26,810	280,035	59,035	57.90	479,190	427,596	411,368	285,812
Kan. City, Mex. & Orient of Tex.....	Sept. 465	1,115,774	182,124	1,297,898	254,318	3,825,339	3,825,339	5,214,668	343,495	63.70	3,118,620	2,652,481	2,549,408	2,023,354
Kansas City Southern.....	Sept. 767	1,872,718	1,653,988	3,526,706	2,123,522	3,094,164	350,351	5,074,828	2,835,155	79.90	25,203,978	18,109,856	17,490,553	17,623,366
Texasarkana & Ft. Smith.....	Sept. 95	261,725	15,126	276,851	182,050	385,513	24,038	656,001	1,491,230	81.80	332,820	217,631	189,599	196,724
Kansas, Oklahoma & Gulf.....	Sept. 95	1,761,524	138,389	1,900,000	207,594	218,184	19,362	3,357,479	394,051	88.30	1,753,479	759,164	621,334	348,298
Lake Superior & Ishpeming.....	Sept. 314	1,694,439	100,777	1,795,216	177,154	36,408	27,662	7,802	1,707,361	80.50	3,018,931	2,101,753	2,020,018	2,677,012
Lake Terminal.....	Sept. 33	108,325	22	108,347	13,556	14,667	2,308	222,179	1,559,744	99.70	1,860,417	1,567,124	1,222,828	988,748
Lehigh & Hudson River.....	Sept. 13	228,115	4,305	232,420	27,374	60,374	1,319	87,817	131,834	94.80	71,775	7,020	-6,507	-20,044
Lehigh & New England.....	Sept. 96	2,126,475	32,001	2,158,476	217,830	390,682	14,167	834,719	50,304	102.70	-34,773	-72,429	-206,778	-343,368
Lehigh Valley.....	Sept. 219	3,353,379	17,450	3,370,829	88,278	125,084	5,787	1,150,031	670,947	78.30	359,378	270,739	221,778	213,971
Los Angeles & Salt Lake.....	Sept. 1,335	4,088,325	762,798	4,851,123	528,244	694,701	79,360	2,359,156	1,501,376	76.30	3,512,542	2,721,546	2,378,992	2,103,847
Louisiana & Arkansas.....	Sept. 1,335	45,609,648	5,636,154	51,245,802	5,746,476	18,742,764	857,404	23,823,339	1,134,808	38.90	181,666	169,822	141,572	62,778
Louisiana Ry. & Nav. Co.....	Sept. 1,209	1,283,435	625,885	1,909,320	272,366	498,605	46,323	636,505	57,102	49.50	1,048,387	944,370	710,069	364,570
Louisiana Ry. & Nav. Co. of Tex.....	Sept. 1,184	11,309,703	4,905,528	16,215,231	17,714,999	2,789,737	4,195,087	452,301	472,828	88.00	295,241	209,717	100,717	385,663
Louisiana Ry. & Nav. Co. of Ark.....	Sept. 302	260,225	35,235	295,460	59,549	54,956	8,087	84,099	214,006	50.10	64,341	57,048	60,701	87,129
Louisiana Ry. & Nav. Co. of La.....	Sept. 302	2,439,559	302,517	2,742,076	504,801	404,165	72,720	857,454	77,469	50.70	433,172	367,887	378,631	367,559
Louisiana Ry. & Nav. Co. of Miss.....	Sept. 343	273,812	34,076	307,888	327,695	70,651	10,876	124,744	10,854	92.70	6,584	4,993	969	5,626
Louisiana Ry. & Nav. Co. of Tex.....	Sept. 343	2,448,008	280,112	2,728,120	580,648	548,087	95,169	1,164,625	16,002	93.00	61,584	4,993	33,474	219,454
Louisiana Ry. & Nav. Co. of La.....	Sept. 206	117,768	18,842	136,610	18,175	11,165	3,110	53,102	89,706	60.40	51,139	-47,139	23,664	.....
Louisville & Nashville.....	Sept. 206	477,616	88,379	565,995	102,888	80,603	18,039	287,669	27,878	86.50	80,521	56,521	29,473	.....
Louisville, Henderson & St. Louis.....	Sept. 5,049	8,266,272	2,466,573	10,732,845	1,550,302	3,366,873	213,238	4,772,851	9,997,140	82.80	1,977,590	1,520,103	1,734,427	1,279,741
Maine Central.....	Sept. 5,043	75,370,692	19,578,772	94,949,464	13,255,061	25,998,951	2,026,613	37,931,502	21,663,854	80.70	19,617,143	15,432,893	16,039,164	12,963,167
Maine Central & St. Louis.....	Sept. 199	206,257	70,358	276,615	64,714	39,968	6,375	86,344	1,206,522	69.90	89,108	69,454	62,865	78,170
Maine Central & St. Louis.....	Sept. 199	1,851,512	578,990	2,430,502	559,891	338,328	58,856	820,246	81,449	71.50	742,156	623,311	513,865	442,487
Midland Valley.....	Sept. 1,201	1,164,594	488,287	1,652,881	200,993	372,451	13,154	757,801	1,490,178	83.40	296,380	197,894	199,154	199,154
Minneapolis & St. Louis.....	Sept. 1,649	10,386,454	1,276,859	11,663,313	1,567,316	2,608,230	2,999,646	7,419,296	426,025	85.30	2,354,498	1,465,706	1,259,560	1,868,545
Minneapolis & St. Louis.....	Sept. 1,649	10,386,454	1,276,859	11,663,313	1,567,316	2,608,230	2,999,646	7,419,296	426,025	85.30	2,354,498	1,465,706	1,259,560	1,868,545
Minneapolis & St. Louis.....	Sept. 1,649	10,386,454	1,276,859	11,663,313	1,567,316	2,608,230	2,999,646	7,419,296	426,025	85.30	2,354,498	1,465,706	1,259,560	1,868,545

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals 1922.
		Freight.	Passenger.	Total.	Way and structures.	Equip-ment.	Traffic.				
Minneapolis, St. Paul & S. S. Marie, Sept. 4,402	3,607,581	\$725,077	\$4,740,683	\$5,465,760	\$774,266	\$674,693	\$67,689	71.70	\$1,341,692	\$1,090,606	\$1,562,179
9 mos. 4,394	28,086,281	5,923,869	37,098,211	43,022,080	6,649,574	5,649,504	997,070	77.90	8,208,854	5,864,128	4,804,260
Mississippi Central, Sept. 257	118,973	18,200	142,657	160,857	31,692	26,628	6,214	83.50	23,437	17,770	25,098
9 mos. 257	1,142,320	150,125	1,339,645	283,587	232,779	212,779	51,381	81.00	254,257	205,986	101,824
Missouri & North Arkansas, Sept. 364	108,757	25,314	143,409	168,723	27,187	21,898	4,712	77.70	31,922	28,865	16,237
9 mos. 364	832,313	201,998	1,104,025	271,770	160,980	130,807	30,863	83.20	185,756	162,331	84,544
Missouri-Kansas-Texas, Sept. 1,813	2,140,277	497,806	2,867,024	4,594,830	459,948	384,801	49,869	78.80	606,836	435,123	630,640
9 mos. 1,906	19,195,417	4,439,069	25,832,386	2,878,154	7,416,027	466,120	7,723,797	75.20	6,411,943	4,911,296	5,970,172
Missouri-Kansas-Texas of Texas, Sept. 1,389	1,486,818	474,482	2,114,808	322,156	353,649	37,784	695,477	70.20	630,290	582,984	397,456
9 mos. 1,305	9,671,847	3,776,580	14,822,843	2,092,752	3,068,017	361,449	6,006,640	82.30	2,622,703	2,170,011	466,538
Missouri Pacific, Sept. 7,364	7,799,256	1,661,055	10,239,452	1,560,338	2,777,366	182,850	3,850,953	85.40	1,499,539	1,114,780	790,734
9 mos. 7,192	62,485,770	14,076,471	83,679,214	12,036,129	22,635,417	1,471,838	33,171,811	86.30	11,442,416	8,036,209	5,671,625
Mobile & Ohio, Sept. 1,165	1,327,788	185,938	1,599,578	250,646	385,601	45,248	589,418	82.30	283,426	211,667	167,886
9 mos. 1,165	12,817,789	1,495,788	15,137,261	1,972,572	3,395,825	415,813	5,550,929	77.60	3,388,103	2,625,086	2,217,061
Monongahela, Sept. 106	467,884	34,898	514,950	62,123	129,098	1,169	1,330,902	66.00	1,495,975	1,406,318	680,370
9 mos. 106	3,992,932	337,530	4,395,057	517,931	952,897	10,017	1,330,902	66.00	1,495,975	1,406,318	680,370
Monongahela Connecting, Sept. 7	.....	.....	241,403	31,194	44,723	374	111,307	79.70	49,087	46,373	35,368
9 mos. 7	.....	.....	2,084,762	241,046	352,843	4,918	1,048,854	81.20	392,533	370,599	194,817
Montour, Sept. 57	217,390	400	219,870	41,016	74,706	1,136	44,270	76.50	51,629	41,059	65,022
9 mos. 57	1,868,311	4,276	1,894,998	306,694	506,891	9,795	367,449	66.20	640,165	522,087	763,182
Nashville, Chattanooga & St. Louis, Sept. 1,258	1,493,103	459,563	2,118,630	434,697	587,329	75,875	767,365	90.90	193,349	133,197	176,707
9 mos. 1,258	13,441,241	3,788,677	18,489,755	3,132,941	7,084,029	656,861	7,084,029	85.70	2,647,213	2,103,319	1,893,277
Nevada Northern, Sept. 165	78,189	10,641	95,501	11,374	6,901	621	125,789	40.90	56,452	49,840	49,749
9 mos. 165	584,966	83,899	717,024	105,473	50,454	5,019	129,961	45.10	393,742	334,306	342,983
Newburgh & South Shore, Sept. 7	.....	.....	168,505	16,244	50,937	.....	64,465	81.20	31,634	18,908	14,893
9 mos. 7	.....	.....	1,581,857	156,153	466,317	.....	637,605	83.80	256,433	140,879	85,631
New Orleans Great Northern, Sept. 274	189,475	37,251	237,132	30,820	44,658	6,382	74,043	70.40	70,195	53,570	49,588
9 mos. 274	1,753,093	311,876	2,145,441	284,212	358,961	52,136	651,031	67.40	699,240	547,757	543,383
New York Central, Sept. 6,899	21,046,506	9,378,433	34,448,185	4,606,466	8,685,249	311,596	11,701,061	77.00	7,907,574	5,910,802	6,011,007
9 mos. 6,899	209,517,402	73,387,752	320,502,476	35,900,476	77,621,652	2,902,601	112,500,449	74.80	80,729,690	62,091,507	60,496,603
Cincinnati Northern, Sept. 244	405,943	13,069	425,835	66,110	164,94	5,319	125,406	86.40	57,846	45,429	17,083
9 mos. 244	3,771,960	127,920	3,963,575	619,032	753,936	42,608	1,297,540	70.10	1,185,689	992,947	609,449
Cleveland, Cin., Chic. & St. L., Sept. 2,407	5,810,951	1,621,588	8,074,169	1,099,411	2,367,249	126,707	2,871,944	82.90	1,378,671	1,018,555	910,369
9 mos. 2,407	52,917,807	13,497,214	72,126,099	8,142,968	16,615,409	984,795	25,852,476	74.50	18,390,143	14,456,843	13,871,284
Indiana Harbor Belt, Sept. 119	.....	.....	8,709,825	945,430	1,186,934	40,307	3,818,122	71.00	2,527,946	2,238,594	1,155,128
9 mos. 119	.....	.....	8,709,825	945,430	1,186,934	40,307	3,818,122	71.00	2,527,946	2,238,594	1,155,128
Michigan Central, Sept. 1,862	4,818,294	2,025,862	7,562,595	1,053,304	1,935,032	104,031	2,523,046	77.30	1,724,962	1,280,249	1,143,446
9 mos. 1,862	48,584,365	16,347,087	71,777,092	8,090,056	14,176,056	888,622	23,822,586	68.20	22,809,519	18,400,255	16,485,085
Pittsburgh & Lake Erie, Sept. 234	3,448,944	295,509	3,853,263	576,628	1,048,696	24,470	1,016,688	71.00	1,119,100	891,317	1,286,775
9 mos. 234	31,536,985	2,486,224	34,825,912	3,772,441	8,716,026	193,525	9,584,449	65.60	11,968,971	9,780,364	13,085,932
New York, Chicago, St. Louis, Sept. 1,696	4,310,763	221,117	4,719,716	651,438	1,243,733	117,359	1,613,890	80.30	928,792	660,378	474,457
9 mos. 1,696	39,762,551	1,807,320	50,369,871	8,923,246	15,353,518	971,008	18,326,526	73.20	11,593,447	9,211,052	8,045,575
New York, New Haven & Hartford, Sept. 2,000	5,215,347	4,796,067	11,190,891	1,628,875	2,720,441	58,267	4,050,184	79.50	2,297,760	1,865,403	1,492,104
9 mos. 2,000	50,956,205	38,049,129	100,516,271	12,076,921	24,144,434	524,199	40,409,045	80.80	19,292,284	15,468,474	8,757,416
Central New England, Sept. 295	600,459	17,795	635,454	139,316	157,927	4,863	209,937	82.20	113,406	89,358	67,744
9 mos. 295	5,420,488	150,056	5,796,592	181,866	231,566	41,642	2,132,486	77.30	1,315,087	1,100,431	610,913
New York, Ontario & Western, Sept. 569	4,722,540	2,699,002	10,716,145	1,549,111	3,400,000	138,296	4,941,688	84.10	1,057,221	1,028,243	1,177,905
9 mos. 569	6,404,914	2,699,002	10,716,145	1,549,111	3,400,000	138,296	4,941,688	84.10	1,057,221	1,028,243	1,177,905
Norfolk & Western, Sept. 2,238	7,154,439	960,037	8,435,184	1,177,679	1,608,338	90,246	2,679,700	74.50	2,154,311	1,603,837	1,796,594
9 mos. 2,238	60,409,224	7,666,996	70,665,181	9,457,438	18,649,366	740,994	23,994,043	76.90	16,296,435	11,690,386	14,360,332
Norfolk Southern, Sept. 931	550,359	134,374	722,106	100,630	113,894	24,740	278,727	75.10	182,559	143,479	123,981
9 mos. 931	5,272,214	1,097,695	6,775,358	912,371	1,031,690	211,598	2,794,276	77.00	1,557,456	1,211,485	900,731
Northern Pacific, Sept. 6,669	7,711,640	1,321,053	9,924,938	1,148,146	1,608,338	150,434	3,201,567	64.40	2,498,058	2,757,153	2,879,894
9 mos. 6,669	54,702,659	11,887,217	73,231,917	11,063,375	17,642,935	1,512,317	28,928,986	84.30	11,513,836	5,136,384	8,166,092
Northwestern Pacific, Sept. 496	470,314	234,132	795,442	93,711	126,296	6,219	258,995	63.70	291,854	245,208	224,743
9 mos. 496	3,522,817	2,050,614	6,159,873	963,686	1,359,778	66,639	2,150,030	70.70	1,801,543	1,366,844	1,253,878
Pennsylvania R. R., Sept. 10,484	42,573,005	14,885,597	62,617,470	8,515,283	16,091,008	650,904	23,431,308	81.30	11,679,589	8,096,672	7,195,393
9 mos. 10,484	381,884,704	118,077,780	547,553,125	64,685,283	145,110,783	5,698,469	214,107,006	81.30	99,544,101	74,584,951	63,813,986
Baltimore, Chesapeake & Atlantic, Sept. 87	102,679	55,518	166,893	12,871	18,071	2,348	123,682	74.10	43,211	33,760	33,760
9 mos. 87	786,632	366,015	1,200,073	132,210	347,462	16,712	731,697	105.20	—62,515	—110,461	—107,651



November 17, 1923

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after 1922.
		Freight.	Passenger.	Total (inc. misc.)	Trans- portation.	Traffic.	General.					
Long Island	397	\$847,376	\$2,115,531	\$3,201,872	\$404,388	\$28,558	\$1,230,422	\$2,161,279	\$1,040,593	\$827,976	\$541,815	\$547,878
Maryland, Delaware & Virginia	397	7,826,282	16,192,060	26,188,019	3,022,902	194,811	10,973,796	19,117,718	7,068,301	5,664,199	3,602,397	4,419,603
Maryland, Delaware & Virginia	52	69,513	45,518	117,265	6,303	1,688	102,799	12,570	14,466	12,570	13,247	12,479
Maryland, Delaware & Virginia	52	551,128	269,355	849,361	71,228	12,595	583,872	928,130	78,769	99,026	112,733	67,514
West Jersey & Seashore	359	418,698	1,044,481	1,566,303	213,916	31,966	599,207	1,147,600	418,703	300,953	267,603	223,478
West Jersey & Seashore	359	3,829,150	6,755,420	11,419,691	1,843,019	156,127	4,828,133	9,191,548	80,500	1,380,328	1,164,997	1,080,732
West Jersey & Seashore	19	27,407	2,116	150,010	31,786	1,013	63,642	118,071	78,700	181,939	47,418	63,447
Peoria & Pekin Union	19	201,825	24,011	1,302,652	246,628	4,797	562,735	1,032,708	269,944	164,944	395,514	412,241
Pere Marquette	2,262	326,277	470,364	4,052,996	760,275	51,271	1,467,567	3,240,975	80,000	812,021	637,889	789,460
Pere Marquette	2,230	26,705,525	4,136,650	34,039,594	4,379,431	449,284	12,931,844	26,088,681	76,600	7,950,963	6,621,659	4,976,946
Philadelphia & Reading	1,125	6,413,968	957,381	7,454,934	1,450,483	102,126	2,805,661	6,635,838	89,000	819,096	348,439	1,343,941
Philadelphia & Reading	1,125	68,437,177	7,939,195	80,431,809	7,292,393	726,196	28,698,443	55,401,592	68,900	25,030,217	22,234,091	20,434,548
Atlantic City	170	117,863	369,291	508,472	118,321	6,836	233,144	413,497	81,300	94,975	74,772	12,355
Atlantic City	170	1,139,382	2,715,612	3,998,716	611,267	57,343	2,021,473	3,120,440	78,000	878,276	697,815	337,804
Perkiomen	41	77,117	8,499	90,986	9,679	112	46,409	62,231	68,400	28,762	28,992	23,287
Port Reading	21	113,617	.....	146,667	25,434	229	65,169	129,932	88,600	16,735	691	43,945
Port Reading	21	1,595,668	.....	2,065,902	175,713	2,061	762,828	1,107,226	53,600	958,676	801,997	276,781
Pittsburgh & Shawmut	102	83,512	3,288	90,335	22,090	1,239	32,467	1,07,027	128,200	26,374	6,836	16,603
Pittsburgh & Shawmut	102	954,652	41,706	1,023,272	196,287	14,029	371,654	1,07,027	105,400	55,755	64,626	4,166
Pittsburgh & West Virginia	89	299,500	83,923	3,998,716	118,321	57,343	2,021,473	3,120,440	78,000	878,276	697,815	337,804
Pittsburgh & West Virginia	89	2,442,507	5,138	93,062	35,222	15,448	469,757	57,901	106,964	4,465	8,468	13,917
Pittsburgh, Shawmut & Northern	210	990,513	57,827	1,077,549	285,846	974	331,637	1,193,537	110,800	115,988	137,642	14,219
Quincy, Omaha & Kansas City	250	69,392	24,342	102,499	45,974	909	41,299	106,964	104,400	2,581	105,848	11,205
Quincy, Omaha & Kansas City	250	666,793	199,444	944,048	34,444	7,709	472,706	1,049,896	111,200	105,848	145,121	198,740
Rich'd, Fredericksburg & Potomac	117	414,684	352,682	897,983	139,764	7,371	283,135	618,995	68,900	278,988	227,079	191,580
Rich'd, Fredericksburg & Potomac	117	4,591,566	3,197,444	9,210,611	885,632	76,139	3,194,754	5,921,841	64,300	3,288,770	2,762,818	1,873,309
Rutland	413	311,856	169,837	601,193	127,998	10,727	225,789	477,179	79,400	124,014	98,872	97,584
Rutland	413	2,953,640	1,182,402	5,128,043	928,655	79,340	2,195,285	4,263,907	83,100	864,236	1,427,948	351,785
St. Louis-San Francisco	4,751	5,053,689	1,763,621	7,283,601	1,120,083	101,862	2,448,637	5,427,684	74,500	1,855,917	1,477,104	1,425,141
St. Louis-San Francisco	4,751	44,468,282	14,821,766	63,908,174	8,233,958	846,776	23,099,160	46,690,029	73,100	17,218,145	14,209,951	13,786,594
Ft. Worth & Rio Grande	235	103,816	28,050	140,305	40,307	4,105	55,670	132,051	94,100	8,254	4,502	1,921
Ft. Worth & Rio Grande	235	778,842	239,029	1,102,196	270,525	29,318	518,164	1,087,589	98,700	14,607	20,726	29,882
St. Louis, San Francisco & Texas	134	151,229	15,321	1,222,033	266,346	4,878	52,800	1,063,116	68,600	53,825	51,782	49,271
St. Louis, San Francisco & Texas	134	1,047,509	125,390	1,222,033	266,346	35,709	487,795	1,063,116	87,000	158,917	139,074	49,271
St. Louis Southwestern	968	1,424,762	175,799	1,670,778	202,123	44,685	383,890	1,043,506	62,500	627,272	509,270	481,661
St. Louis Southwestern	968	13,110,697	1,456,887	15,300,086	1,724,983	391,696	3,898,919	9,479,292	58,200	5,820,794	4,949,051	4,528,669
St. Louis Southwestern of Texas	807	679,972	135,553	839,238	260,194	20,481	285,577	734,949	85,500	124,289	96,738	39,817
St. Louis Southwestern of Texas	807	4,667,672	962,755	6,043,064	1,238,266	183,647	2,844,556	6,740,241	111,500	697,177	942,151	891,021
San Antonio & Aransas Pass	739	663,784	111,170	807,072	92,848	11,000	224,613	492,956	61,100	314,116	299,027	234,542
San Antonio & Aransas Pass	739	3,508,092	670,506	4,473,198	864,885	97,914	1,713,923	4,039,672	90,300	435,352	322,744	54,258
San Antonio, Uvalde & Gulf	317	76,121	26,722	333,779	14,702	3,550	38,872	75,755	68,100	35,443	32,216	1,121
Seaboard Air Line	3,577	2,735,843	757,355	3,970,605	546,913	131,809	1,452,560	3,079,334	77,600	891,271	715,925	656,067
Seaboard Air Line	3,576	26,786,255	7,588,116	38,291,505	4,282,392	1,214,900	15,250,683	29,836,174	77,900	8,455,331	6,874,452	5,442,310
Southern Ry.	6,971	78,420,707	25,274,271	111,927,631	15,583,547	2,111,231	41,191,728	84,290,531	75,400	27,537,100	20,301,755	12,801,964
Alabama Great Southern	318	638,866	198,366	890,313	112,878	27,471	274,056	655,477	73,600	234,836	186,437	165,046
Alabama Great Southern	318	6,038,597	1,612,568	8,100,275	961,094	78,646	1,552,374	5,654,684	69,800	2,445,591	1,980,439	1,955,325
Cinn., New Orleans & Tex. Pacific	338	13,287,522	3,341,419	17,416,692	2,306,022	325,380	411,024	12,442,982	71,400	4,973,710	4,149,555	3,633,423
Georgia, Southern & Florida	402	269,571	111,250	419,893	71,051	6,079	160,142	333,653	79,500	86,240	66,119	40,010
Georgia, Southern & Florida	402	2,574,808	1,018,925	3,914,835	637,710	78,646	1,552,374	5,654,684	78,700	833,853	654,856	216,386
New Orleans & Northeastern	207	425,978	93,784	520,330	72,197	12,209	186,826	439,970	76,500	135,248	87,024	76,758
New Orleans & Northeastern	207	3,877,885	791,504	5,202,330	727,197	98,297	1,860,913	3,924,682	75,400	1,277,648	820,155	746,333
Northern Alabama	110	129,722	14,465	148,043	20,794	2,696	45,611	80,920	54,700	67,123	62,011	40,046
Northern Alabama	110	1,137,718	120,650	1,285,706	199,655	19,725	49,554	761,087	52,200	525,447	465,447	252,229
Southern Pacific	7,122	99,550,443	35,076,288	149,306,844	20,235,334	2,461,780	47,895,638	102,954,443	69,000	46,352,401	34,613,195	25,766,910

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals.
		Freight.	Passenger.	Total (inc. misc.).	Maintenance of way and structures.	Equip-ment.	Traffic.					
Arizona Eastern .....	382	\$229,428	\$27,494	\$273,927	\$47,304	\$3,061	\$88,792	\$19,040	\$201,471	\$88,792	\$48,209	\$33,607
Atlantic Steamship Lines .....	382	2,319,260	259,143	2,719,504	362,180	427,374	2,719,504	168,193	1,698,556	801,875	72,090	515,632
Galveston, Harrisburg & San Antonio, Sept. 9 mos.	382	974,706	63,980	1,091,627	170,627	170,627	684,336	29,996	1,091,627	155,914	155,914	98,813
Houston & Texas Central, Sept. 9 mos.	382	9,123,548	565,353	10,146,451	1,386,888	1,523,896	19,136	250,143	8,224,889	1,814,562	1,814,562	1,266,940
Houston, East & West Texas, Sept. 9 mos.	1,379	1,646,179	452,459	2,225,733	393,521	398,171	42,523	67,858	1,677,560	461,275	386,905	161,901
Houston & Texas Central, Sept. 9 mos.	1,379	12,263,327	3,781,693	17,066,660	3,465,012	3,510,234	382,901	631,252	14,622,105	1,851,509	1,483,453	1,538,408
Louisiana Western, Sept. 9 mos.	923	1,064,736	296,578	1,434,072	244,970	245,613	27,097	45,001	975,419	408,787	350,025	431,811
Louisiana Western, Sept. 9 mos.	923	7,277,362	2,380,501	10,308,182	2,198,808	2,194,212	229,707	411,552	8,722,308	1,153,065	794,532	1,640,761
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	191	230,436	46,404	291,915	59,197	60,404	4,321	9,059	220,091	57,409	40,989	37,748
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	191	1,707,651	405,078	2,231,452	518,664	522,971	33,512	79,201	1,979,812	165,207	54,660	170,201
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	207	252,859	95,960	376,883	58,729	70,804	11,408	16,667	267,953	74,472	14,166	89,977
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	207	2,321,502	820,483	3,367,824	562,681	648,021	90,134	151,443	2,485,284	616,426	626,227	513,678
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	400	532,954	158,400	743,660	154,983	158,605	17,716	30,411	640,027	57,041	40,539	85,062
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	400	4,566,241	1,407,983	6,461,859	1,473,270	1,414,855	148,338	278,077	5,903,321	141,247	100,240	40,370
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	507	513,230	180,384	751,352	182,488	169,979	12,902	25,381	769,849	63,646	100,240	40,370
Morgan's L. & T. R. & S. Co., Sept. 9 mos.	507	4,654,081	1,476,731	6,570,984	1,689,948	1,547,949	115,269	228,554	6,120,029	163,934	21,602	78,679
Spokane International, Sept. 9 mos.	165	69,345	18,868	95,115	22,590	9,560	3,262	5,368	75,262	14,126	5,865	39,931
Spokane, Portland & Seattle, Sept. 9 mos.	165	672,779	155,081	877,604	148,537	97,989	29,073	52,244	662,408	162,618	95,064	151,854
Spokane, Portland & Seattle, Sept. 9 mos.	165	542,503	165,470	773,720	117,601	139,344	10,805	18,917	512,804	185,563	144,743	169,716
Spokane, Portland & Seattle, Sept. 9 mos.	554	4,092,799	1,301,580	5,946,497	767,155	1,044,999	91,751	159,454	3,984,882	1,285,726	1,096,445	1,048,894
Tennessee Central, Sept. 9 mos.	287	191,551	53,111	258,936	62,976	45,468	7,253	9,530	225,810	27,441	9,874	6,643
Tennessee Central, Sept. 9 mos.	287	1,781,438	414,229	2,317,558	401,830	394,910	53,310	87,624	1,819,718	442,362	279,586	50,508
Terminal Railroad Assoc. of St. L., Sept. 9 mos.	37	.....	.....	467,220	94,775	74,887	962	16,811	342,814	55,342	165,350	23,079
Terminal Railroad Assoc. of St. L., Sept. 9 mos.	37	.....	.....	3,836,513	812,569	365,387	8,991	80,454	2,580,470	682,054	1,702,815	1,525,786
East St. Louis Connecting, Sept. 9 mos.	1	.....	.....	215,835	18,318	27,667	276	2,238	116,296	80,848	60,140	57,738
East St. Louis Connecting, Sept. 9 mos.	1	.....	.....	1,798,199	118,705	10,032	2,870	23,350	793,509	881,090	698,968	609,387
St. L. Merchants' Bridge Term., Sept. 9 mos.	9	.....	.....	4,178,255	37,543	53,196	888	6,681	310,046	72,613	61,267	166,975
St. L. Merchants' Bridge Term., Sept. 9 mos.	9	.....	.....	3,676,254	441,689	262,771	8,278	61,719	2,472,835	926,502	873,890	828,302
St. Louis Transfer Ry., Sept. 9 mos.	6	.....	.....	79,628	4,590	14,970	160	38,951	59,871	19,300	13,212	957
St. Louis Transfer Ry., Sept. 9 mos.	6	.....	.....	654,314	46,380	43,805	1,494	12,225	592,735	207,753	131,028	22,700
Texas & Pacific Ry., Sept. 9 mos.	1,932	1,832,568	666,766	2,917,590	323,275	523,672	50,742	78,953	1,934,126	668,035	653,431	273,431
Texas & Pacific Ry., Sept. 9 mos.	1,932	15,688,770	5,577,202	22,663,770	5,613,556	5,613,556	438,465	799,049	18,741,661	3,204,954	2,519,193	2,314,911
Toledo, Peoria & Western, Sept. 9 mos.	247	108,211	38,704	161,209	39,989	53,669	2,405	7,334	168,538	104,500	25,897	3,051
Toledo, Peoria & Western, Sept. 9 mos.	247	827,621	379,871	1,267,492	257,776	448,890	22,478	67,902	1,406,538	107,500	107,500	147,321
Trinity & Brazos Valley, Sept. 9 mos.	368	824,527	122,286	1,006,594	27,047	46,602	3,175	14,584	256,756	196,933	156,933	53,243
Trinity & Brazos Valley, Sept. 9 mos.	368	1,786,874	162,284	2,066,252	329,906	374,635	28,900	106,292	1,537,315	404,806	189,824	104,320
Ulster & Delaware, Sept. 9 mos.	128	69,508	38,867	142,401	25,771	20,254	3,409	7,975	130,406	91,600	11,895	17,369
Ulster & Delaware, Sept. 9 mos.	128	675,165	402,427	1,405,454	185,785	211,410	27,986	71,931	1,160,989	82,400	131,518	38,872
Union R. R. of Penna., Sept. 9 mos.	45	.....	.....	1,147,401	271,166	275,174	1,199	7,323	338,635	74,100	308,776	450,663
Union R. R. of Penna., Sept. 9 mos.	45	.....	.....	9,605,178	605,085	2,102,880	1,589	69,207	7,108,344	2,002,714	2,884,996	3,078,688
Union Pacific, Sept. 9 mos.	3,708	9,764,694	1,747,077	12,607,227	1,410,687	2,188,079	129,880	290,114	7,359,494	58,400	4,730,092	4,136,281
Union Pacific, Sept. 9 mos.	3,708	62,467,632	13,666,073	83,807,024	18,085,554	1,308,032	23,884,240	2,439,348	58,473,024	20,243,909	18,839,714	17,040,717
Oregon Short Line, Sept. 9 mos.	2,366	3,056,455	505,102	3,773,582	622,409	633,046	43,375	118,643	2,599,922	68,900	1,713,284	517,910
Oregon Short Line, Sept. 9 mos.	2,366	21,140,334	4,234,737	27,394,930	4,814,829	5,557,435	402,942	978,561	20,962,600	76,500	4,132,330	3,558,567
Oregon Wash. R. R. & Nav. Co., Sept. 9 mos.	2,239	2,369,899	545,557	3,077,944	655,646	478,544	59,883	1,020,039	2,374,254	525,713	363,154	76,309
Oregon Wash. R. R. & Nav. Co., Sept. 9 mos.	2,239	15,241,609	4,323,338	21,377,988	4,487,281	3,944,609	565,179	1,057,925	19,525,298	578,716	307,640	1,342,334
St. Joseph & Grand Island, Sept. 9 mos.	258	250,667	25,848	297,028	57,478	55,575	2,694	11,108	237,857	80,100	48,040	1,063
St. Joseph & Grand Island, Sept. 9 mos.	258	1,978,337	226,484	2,669,833	433,779	482,517	22,612	109,310	2,094,214	156,960	28,891	42,376
Utah, Sept. 9 mos.	102	143,152	734	144,994	41,820	39,255	376	5,623	124,624	86,000	13,071	5,962
Utah, Sept. 9 mos.	102	1,121,214	92,384	1,315,112	236,605	331,297	3,223	46,941	926,834	147,700	88,588	177,755
Virginian, Sept. 9 mos.	540	1,612,010	92,408	1,805,964	1,717,400	490,347	11,765	32,144	1,152,453	63,800	552,176	133,570
Virginian, Sept. 9 mos.	540	14,809,546	711,399	16,195,964	1,550,939	3,886,728	105,782	319,722	10,174,245	5,374,266	5,680,335	4,665,729
Wabash, Sept. 9 mos.	2,472	4,549,851	941,538	5,907,626	924,798	1,195,664	129,032	156,954	4,481,824	75,900	1,235,288	943,345
Wabash, Sept. 9 mos.	2,472	38,131,889	7,328,210	49,226,645	6,974,581	10,344,931	1,122,271	1,388,181	38,470,459	78,100	9,038,974	6,755,309
Western Maryland, Sept. 9 mos.	804	1,752,014	91,537	1,910,216	255,597	501,045	40,163	45,721	1,457,754	362,754	405,221	267,211
Western Maryland, Sept. 9 mos.	804	16,093,030	750,848	17,681,388	2,116,951	4,688,286	31,014	401,275	13,748,721	3,197,667	3,480,241	2,272,686
Western Pacific, Sept. 9 mos.	1,043	1,167,183	260,699	1,580,989	251,031	199,304	35,164	36,552	1,056,998	66,900	442,178	453,319
Western Pacific, Sept. 9 mos.	1,043	7,335,693	1,862,348	10,061,412	1,784,381	1,784,381	3,416	30,801	7,231,850	1,519,814	1,955,149	399,018
Wheeling & Lake Erie, Sept. 9 mos.	511	1,552,481	68,408	1,724,529	221,752	477,368	23,304	37,144	1,444,802	75,800	314,448	967,752
Wheeling & Lake Erie, Sept. 9 mos.	511	12,563,238	573,014	14,256,548	1,764,897	4,191,946	155,571	325,246	11,053,162	2,195,736	1,866,690	590,442



## Traffic News

The Northwest Regional Advisory Board will hold a special meeting at St. Paul, Minn., on November 20.

The Canadian Pacific has started the operation of freight service over its recently completed cut-off from Consul, Saskatchewan, to Climax, a distance of 61 miles.

R. G. Hyett, traffic manager of the Texas Freight Traffic Association, has been placed in charge of the newly formed traffic department of the Lumbermen's Association of Texas.

The Southeastern Express Company now does business in Indianapolis, Indiana, reaching that city over the Interstate Public Service Electric Company's Lines from Louisville, Ky. There are seven trains in each direction every business day.

### Overcharges Refunded in Sixty Days

The agent who promises to save merchants large sums of money if he is intrusted with their freight bills and with authority to collect from the railroads any overcharges discovered, is not without a reason for existence. At least, the presumption that he is needed appears in a letter sent to the Central of Georgia, recently, appealing for a system of assessing freight charges under which errors would always be surely corrected so that the consignee would not have any motive to "send his bills to outside concerns to be audited."

Replying to this letter, President W. A. Winburn told the applicant that such a system was already in use; and he continued:

"The Central of Georgia accounting department during the first seven months of 1923 handled 1,072,734 way-bills, on which were issued 55,339 corrections, reducing the freight charges originally billed, \$447,145. It is our effort to have all overcharges and undercharges corrected before the bill is presented; and the bills are further revised at the office of the auditor of traffic. All way-bills are revised within 60 days and corrections are issued currently, so that practically all overcharges located are paid to shippers within 60 days from the time the freight charges were originally collected."

### Car Service Division Cancels Box Car Orders

The Car Service Division of the American Railway Association has cancelled box car orders No. 101 and No. 102, which became effective April 15, 1923, and which prohibited roads from holding box cars belonging to other roads for prospective loading and from moving such cars, either loaded or empty, in an opposite direction from the home lines. The cancellation of these orders restores the full operation of the car service rules in the handling of eastern and southern box cars in western territory and in the handling of western box cars in eastern and southern territory.

A record of the movement of loaded and empty box cars eastward and westward through designated passing points extending from the Straits of Mackinac on a line through Cairo to New Orleans for the six months ending September 30 shows that westbound loaded business equalled 90 per cent of the eastbound loaded business and the same ratio applied on the main east and west routes between Lake Michigan and the Ohio river. In the four months following the effective date of order No. 101, 20 of the principal eastern roads reduced the number of western box cars in their possession by 46.5 per cent, while six of the principal southern roads reduced their holdings of these cars 47.9 per cent. This decrease represented a total of 51,080 cars. During the same period there was a net increase of 84,570 box cars and an increase of 98,319 in the number of home box cars on home roads in the three western regions. The number of box cars of western ownership delivered empty at Chicago, Peoria and St. Louis during these four months exceeded 100,000 cars. In the six weeks following August 15, there was an increase of 2,028 western box cars on the principal eastern lines and an increase of 925 western box cars on the principal southeastern lines.

## Commission and Court News

### Personnel of Commissions

E. M. Durham, Jr., who has been in charge of the department of ways and structures in the Railroad Administration, has been appointed also director of the Division of Liquidation Claims, with office at Washington, D. C., succeeding E. M. Alvord, deceased.

### State Commissions

Meeting at the call of the Virginia Corporation Commission, about 150 shippers and shippers' representatives gathered at Richmond on October 31 and, after long discussion prepared a complaint to be presented to the Interstate Commerce Commission asking reductions in freight rates, particularly from Virginia cities to certain points in North Carolina.

The Public Service Commission of Alabama has notified the railroads of the State that proposed changes in freight rates on intrastate shipments must be presented to the commission for approval before being published. The practice in vogue hitherto of checking tariffs and passing upon them after they have been received to be filed, cannot be longer continued as new tariffs and supplements are being submitted in such large numbers that there is not time to do the work.

### Court News

#### Safety Appliance Act—Defective Couplers

The Texas Court of Civil Appeals holds that a railroad cannot, by a rule relieving switchmen of going between the cars, when, because of its failure to comply with the Safety Appliance Act, the switchmen could not uncouple the cars without going between them, exempt itself from liability under Section 2 of the act, requiring automatic couplers.—*St. Louis Southwestern v. Hosey* (Tex. Civ. App.), 247 S. W. 327.

#### Waiver of Requirement of Written

##### Notice to Furnish Cattle Cars

The Arkansas Supreme Court holds that under the rule approved by the Interstate Commerce Commission requiring written notice to furnish cars for cattle within a reasonable time, a railroad's agent may refuse to accept an oral order or notice for a car, but having done so, he thereby waives the form of notice.—*Missouri Pacific v. Henderson* (Ark.), 247 S. W. 1070.

#### Placing Bar Across Door of

##### Bobtailed Caboose Negligence

The Texas Court of Civil Appeals holds that the placing of an iron bar across the door of a "bobtailed caboose" is negligence, making the railroad liable for the death of a trainman who when he stepped from a flat car to enter the caboose, stooped to pass under the bar and fell between the cars.—*St. Louis Southwestern v. Johnson* (Tex. Civ. App.), 249 S. W. 1092.

#### State Statute Requiring Redemption

##### of Unused Tickets

Congress having undertaken, by the Transportation Act, to appropriate the field as to redemption of unused interstate passenger tickets, the Texas Court of Civil Appeals holds that the state law relating thereto, providing a penalty for failure to refund, does not apply to interstate commerce. Under the state law the carrier could be exempt in one state and liable in another, and connecting carriers would have to maintain facilities for redeeming tickets sold by the initial carrier, creating a burden on interstate commerce.—*Neubert v. Chicago, R. I. & G.* (Tex. Civ. App.), 248 S. W. 141.

## Foreign Railway News

### New Madrid-Valencia Railway

According to a recent report from sources which have hitherto been reliable a group of foreign financiers and the Spanish government have agreed upon the project of a railroad joining Madrid and Valencia, says Commerce Reports.

### Colombian Railway to Expand

The sum of \$2,000,000 will be spent in the near future for general improvements and the gradual extension of the roadbed of the Ferrocarril del Pacifico, Colombia, the entire yearly earnings of the road and a portion of customs receipts being set aside for improvement purposes, according to Commerce Reports.

### Rolling-Stock Construction Increases in Poland

A total of 140 passenger and 1,910 freight cars were built in Poland in 1922, compared with 20 passenger and 400 freight cars built in 1921, according to the acting commercial attaché at Warsaw. Of the locomotives constructed during 1922, 10 were built at the locomotive works at Chrzanow. Polish locomotive and car building companies have on hand orders for 2,600 locomotives, 7,800 passenger, and 70,400 freight cars.

### Reconstruction Progress in Japan

TOKIO.

How to rehabilitate the Japanese State Railways is proving to be a problem much harder to solve than ever imagined by the authorities. It will be two years, it is believed, before the work will be finished.

The result of investigations as conducted up to the close of September shows that the damage done to the State Railways by the great earthquake and conflagration is no less than 75,000,000 yen (yen = 49.9 cents). Temporary repairs have been made on several sections of the damaged lines with the help of army engineers and on the trunk lines trains are running again. The De-



Ueno Station, Tokio, Burnt Down September 2

partment of Railways finds it very difficult to start permanent reconstruction partly because of the lack of material and partly because of a scarcity of skilled labor. One more trouble which the department has to combat is the shortness of funds in hand which has resulted from the paralysis of commerce in Tokio and Yokohama and the railway department's free transportation of relief freight.

THE NOVEMBER meeting of the Pacific Railway Club was held on November 15 at the Hotel Oakland, Oakland, Cal., at which time L. H. Collett, locomotive engineer of the Atchison, Topeka & Santa Fe, spoke on "The Evolution of the Locomotive from 1679 to the Electric Era." Mr. Collett's talk was illustrated with lantern slides.

## Equipment and Supplies

### Locomotives

THE CHICAGO & NORTH WESTERN has ordered a snow plow from the American Locomotive Company.

THE ILLINOIS TRACTION, INC., Chicago, Ill., is preparing designs for 6, 80-ton electric locomotives to be constructed in the company's shops at Decatur, Ill.

### Freight Cars

THE ANN ARBOR is inquiring for 500, 40-ton box cars.

THE SOUTHERN RAILWAY is inquiring for 1,000 steel center constructions.

THE WABASH is inquiring for 250 all-steel gondola cars of 70 tons' capacity.

THE ILLINOIS TRACTION, INC., is inquiring for 100 box cars of 40 tons' capacity.

THE ULSTER & DELAWARE, reported in the *Railway Age* of October 6 as inquiring for 10 caboose cars, has ordered this equipment from the Pressed Steel Car Company.

THE CARNEGIE STEEL COMPANY will have repairs made to 248 steel hopper cars at the shops of the Koppel Car Repair Company and repairs made to 250 steel hopper cars at the shops of the Greenville Steel Car Company.

### Passenger Cars

THE CENTRAL OF NEW JERSEY, reported in the *Railway Age* of September 22 as inquiring for 50 coaches, 5 combination passenger and baggage cars and 10 baggage cars, has ordered the 50 steel coaches from the Standard Steel Car Company, the 5 combination passenger and baggage cars from the Pressed Steel Car Company and the 10 baggage cars from the American Car & Foundry Company.

### Iron and Steel

THE GREAT NORTHERN is inquiring for 1,300 tons of structural steel.

THE NEW YORK CENTRAL is inquiring for 200 tons of structural steel for bridge repairs.

THE ATLANTIC COAST LINE has ordered 200 tons of fabricated steel from the Phoenix Bridge Company.

THE ST. PAUL BELT LINE has ordered 400 tons of structural steel from the Wisconsin Bridge & Iron Co.

THE BOSTON & MAINE has ordered from the McClintic-Marshall Company 500 tons of steel for bridges.

THE NORFOLK & WESTERN has ordered 300 tons of steel for bridges from the American Bridge Company.

THE CHICAGO, BURLINGTON & QUINCY has ordered 700 tons of structural steel from the American Bridge Co.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has ordered 4,000 tons of steel rails from the Illinois Steel Company.

THE BALTIMORE & OHIO has placed an order with the American Bridge Company for 1,300 tons of steel for bridges.

THE LOUISVILLE & NASHVILLE has ordered 10,500 tons of rail from the Tennessee Coal, Iron & Railroad Company.

THE CHARLESTON & WESTERN CAROLINA has ordered 1,500 tons of rail from the Tennessee Coal, Iron & Railroad Company.



THE PENNSYLVANIA is inquiring for 350 tons of structural steel for use in Chicago and for 200 tons for its Southwestern region.

NEW YORK, CHICAGO & ST. LOUIS has ordered 18,000 tons of steel rails from the Illinois Steel Company, the Carnegie Steel Company, the Bethlehem Steel Company and the Inland Steel Company.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has ordered 375 tons of structural steel from the McClintic-Marshall Company, 96 tons from the Ft. Pitt Bridge Company, 52 tons from the American Bridge Company and 12 tons from the Mt. Vernon Bridge Company.

THE SOUTHERN RAILWAY has ordered 50,000 tons of new steel rail for delivery during the first six months of 1924. Included in the purchase are 42,200 tons of 100-lb. rail and 7,800 tons 85-lb. rail. Of this tonnage the Tennessee Coal, Iron & Railroad Company has the order for 40,700 tons to be rolled at Ensley, Ala., the Bethlehem Steel Company 7,200 tons to be rolled at Sparrows Point, Md., and the Illinois Steel Company 2,100 tons to be rolled in the Chicago district.

## Machinery and Tools

THE DENVER & RIO GRAND WESTERN has ordered a 90-in wheel quartering machine.

THE NEW YORK CENTRAL is inquiring for about 17 machine tools including various sizes of lathes, mostly small ones, and three or four axle lathes. The company is also asking for a 2-in. bolt cutter, a triple head bolt cutter, 2 motor driven bolt threaders, a No. 5 universal milling machine, a 36-in. by 36-in. milling machine and a 30-in. by 120-in. planer.

## Miscellaneous

THE VIRGINIAN has ordered from S. F. Bowser & Co., Inc., Ft. Wayne, Ind., a 12,000-gal. 5/16-in. black iron tank with a 5-gal. hand operated pump to handle kerosene.

THE SOUTHERN PACIFIC has ordered from S. F. Bowser & Co., Inc., Ft. Wayne, Ind., 435 pumps and tanks to be used along its right-of-way to store gasoline for motor cars and signal lamp oil.

THE DELAWARE & HUDSON has ordered from the S. F. Bowser & Co., Inc., eight basement tanks with pumps on the first floor and necessary accessories for installation in its oil house at Colonie, N. Y.

THE NEW YORK, NEW HAVEN & HARTFORD will receive bids until 12 o'clock noon, November 30, at New Haven, Conn., for its requirements of steel castings, to be ordered as required during a period of one year beginning December 1, 1923.

THE KANSAS CITY RAILWAYS COMPANY has ordered from S. F. Bowser & Co., Inc., five evaporation proof tanks and pumps for handling paint oil and seven tanks for lubricating oil with barrel emptying accessories for its oil house at Kansas City, Mo.

THE ATCHISON, TOPEKA & SANTA FE is planning to buy a large new freight car barge at an estimated cost of about \$200,000, for service in the San Francisco Bay territory. The railroad company already has a fleet of barges and tugs employed in handling the freight business in the Bay district. Recently a large steel tug, the Basford, was bought from the United States Shipping Board and put in service in the Bay.

ON RECOMMENDATION of the Interstate Commerce Commission medals of honor have been awarded by the President to Lawrence F. Lapp, Cozad, Nebr., and James A. Underwood, of Shreveport, La. Mr. Lapp, a station employee of the Union Pacific at Cozad, Nebr., on December 30, 1922, ran in front of a passenger train and rescued an elderly lady whose hat had flown off and who, while in pursuit of it, was in danger of being struck. Mr. Underwood, a switchman on the Kansas City Southern, on January 3, 1923, while riding on the footboard of the tender of a switch engine, saved an elderly gentleman and a lady from being struck by the engine. He reached forward and pulled them from the track.

## Supply Trade News

The Crane Company will construct a two-story foundry, 160 by 500 ft. in area, at 4100 South Kedzie avenue, Chicago.

The Cleveland sales office of the Jones & Laughlin Steel Corporation has been moved from 1314 Rockefeller Building to 1407-11 Union Trust Building.

The Morrison & Risman Company, Buffalo, N. Y., dealer in railway equipment, has opened a district sales office in the Ulmer Building, Cleveland; Ohio, in charge of R. B. Morrison.

The Black River Tie and Timber Company has been incorporated in Missouri and has opened offices in the Railway Exchange Building, St. Louis, Mo. O. S. Roeder is secretary and treasurer.

Edmund H. Jahnz has been appointed agent of the Mercury Manufacturing Company, Chicago, for its tractors and trailers in Philadelphia, Pa., and surrounding territory. Mr. Jahnz's office is at 2009 Market street, Philadelphia.

Thomas A. Martin, previously in charge of construction work for the Whitehead & Kales Iron Works, Detroit, Mich., has been appointed engineer in charge of the erection of the Union Pacific shop buildings at Los Angeles, Cal., for the Lynch Cannon Engineering Company.

Stuart B. Over, formerly senior assistant engineer in the valuation division of the Interstate Commerce Commission and Francis Tingley, formerly supervisor of overhead lines for the Washington Railway & Electric Co., Washington, D. C., have formed a partnership under the name of Over & Tingley, to engage in general engineering at Darby, Pa.

H. E. Graham, manager of traffic and sales of the Pressed Steel Car Company and its subsidiary, the Western Steel Car & Foundry Company, with headquarters at New York, has resigned to become vice-president in charge of sales of the Illinois Car & Manufacturing Company with headquarters at Chicago, effective January 1. F. M. Garland, assistant to Mr. Graham, has been appointed traffic manager, taking over part of the duties of Mr. Graham.

The Schubert-Christy Construction & Machinery Co., has been organized at St. Louis, Mo., by Frank H. Schubert, district manager of the Wheeler Condenser & Engineering Co., and William G. Christy, formerly with the St. Louis Boat & Engineering Co. The company will be located in the Railway Exchange building and will specialize in the design and construction of water cooling equipment for refrigerating and power plants, and other types of special machinery. In addition the company will represent manufacturers of power plant equipment.

Dana R. Bullen, manager of the supply department of the General Electric Company, Schenectady, N. Y., has been appointed assistant vice-president on the staff of the vice-president in charge of sales of general apparatus and supplies. The lighting department has been changed to the central station department and the name of the power and mining department changed to the industrial department. C. W. Stone, manager of the former lighting department continues as manager of the central station department. M. O. Troy, who was manager of the transformer sales department, has been appointed executive assistant manager of the central station department with headquarters at Schenectady, and W. M. Stearns, formerly one of the assistant managers of the supply department has been appointed assistant manager of the central station department. R. D. Mure, assistant manager of the former lighting department, has been appointed assistant manager of the central station department in charge of apparatus sales. F. G. Vaughen and present staff have been transferred to the central station department and continues in charge of the meter business of the company, Mr. Vaughen retaining the title of sales manager. W. S. Clark and present

staff in charge of the company's wire and cable business, have been transferred to the central station department and the railway supply section and present staff conducting the company's business on railway motor and control parts, railway line material and rail bonds, have been transferred from the supply department of which **E. P. Waller** is manager. Industrial heating devices, industrial control, mine locomotive and stationary motor repair parts, and fabroil, textoil and textolite gears sections of the supply department, have been transferred to the industrial department of which **A. R. Bush**, manager of the department under its former name of power and mining department, continues in charge. **N. R. Birge**, formerly one of the two assistant managers of the supply department, has been assigned to the staff of the president and will assist in supervision of associated manufacturing companies, being associated with **D. C. Durland** in this work.

### October Locomotive Shipments

The Department of Commerce has prepared the following table showing shipments of locomotives in October from the principal manufacturing plants, based on reports received from the individual establishments:

	LOCOMOTIVES			Ten months' total, January to October	
	October 1923	September 1923	October 1922	1923	1922
Shipments—					
Domestic .....	295	313	133	2,410	718
Foreign .....	15	22	12	151	187
Total .....	310	335	145	2,561	905
Unfilled Orders— (End of month)					
Domestic .....	915	1,102	1,420	.....	.....
Foreign .....	62	76	118	.....	.....
Total .....	977	1,178	1,538	.....	.....

### The Bradford Corporation

The Bradford Corporation has acquired all the capital stock and assets, and will assume all the obligations of the Bradford Draft Gear Company, the Republic Railway Equipment Co., Inc., and the Joliet Railway Supply Company. These properties will be operated as one unit after December 31, 1923.

The officers of the Bradford Corporation will be Horace Parker, president, New York; Burton Mudge, executive vice-president, Chicago; W. W. Rosser, vice-president, Chicago; Floyd K. Mays, vice-president, New York; A. F. Stuebing, chief engineer, New York; E. H. Barnes, secretary, New York; James H. Slawson, general manager, Chicago; Chas. A. Carscadin, general sales manager, Chicago; Wm. F. Hoffman, treasurer, New York; Arthur L. Pearson, assistant vice-president, Chicago. The executive committee will be Fred A. Poor, chairman, Horace Parker and Burton Mudge.

The Bradford Corporation will maintain executive offices at 25 West Forty-third street, New York City, and Railway Exchange Building, Chicago, and sales offices in Washington, D. C., in charge of Harry F. Lowman; St. Louis, Missouri, in charge of Walter C. Doering; San Francisco, California, in charge of E. F. Boyle; Mexico City, in charge of Joseph H. Cooper. The company will be represented in Canada by the Holden Company, Limited, of Montreal.

The company will sell and manufacture Bradford Draft Gears, Bradford Draft Arms, Chambers Throttle Valves, Huntoon Truck Bolsters and Huntoon and Joliet Brake Beams.

THE GREAT NORTHERN has put into effect a plan whereby employees may become stockholders on a partial payment plan. The stock may be purchased with an initial payment of \$5 a share followed by monthly installments as small as \$3 a share until payment is completed. Installments may be paid by monthly deductions from the employees' pay and the account will be carried at six per cent interest. The company assumes no responsibility other than its agreement to buy the stock as directed and to carry it on the stipulated terms. Each contract is limited to 25 shares, but may be repeated as often as desired. Cash purchases are limited to 100 shares each.

## Railway Construction

**ARKANSAS SHORT LINE.**—The Interstate Commerce Commission has denied this company's application for a certificate for the construction of a line from a connection with a logging road at McCormick, Ark., to a connection with the Missouri Pacific at McDonald, Ark., and the operation in interstate commerce of the entire line from Truman to McDonald, 32.6 miles. The route is partly paralleled by other lines and the commission is unable to find that public convenience and necessity require the construction.

**ATCHISON, TOPEKA & SANTA FE.**—This company has awarded a contract to W. T. Montgomery, Fort Worth, Tex., for the construction of a spur track, 6½ miles long, from Oak Cliff, Tex., to West Dallas. The work includes the construction of one subway at an intersection with an interurban railway.

**GALVESTON, HARRISBURG & SAN ANTONIO-SOUTHERN PACIFIC.**—This company will construct an addition to its engine terminal at San Antonio, Tex., with the company forces at a cost of \$80,000, including boiler washing plant and enlargement of roundhouse by the construction of three additional engine stalls and the extension of the existing six stalls, 47 ft.

**GRAND RIVER VALLEY (Electric).**—This company will construct an extension of its lines from Fruita, Colo., to the High Line district, a distance of three and one-half miles, at a cost of approximately \$65,000.

**PENNSYLVANIA.**—This company has been ordered by the Illinois Commerce Commission to construct, jointly with the Terminal Railroad Association of St. Louis and the Baltimore & Ohio, a subway under their tracks at Ninth street, East St. Louis, Ill. The subway will be 750 ft. long and will contain two, 20-ft. roadways and two, 5-ft. sidewalks and will cost approximately \$480,000.

**PHILADELPHIA & READING.**—This company has recently awarded the following contracts in connection with the ventilation of its Mahanoy tunnel: To the B. F. Sturtevant Company, Washington, D. C., for the furnishing and erection of the fans, ducts and motors complete ready for operation; to Woodfield-Thompson Company, Philadelphia, for the electrical wiring and equipment for lighting and power. The company has awarded a contract to the Roberts Filter Mfg. Co., Darby, Pa., for the furnishing and installation of filtration equipment at its Bulson street engine house, Camden, N. J. This equipment is to be furnished and installed by the contractor and it consists of two steel filter tanks each weighing approximately 15,500 pounds, complete charges of filter sand and gravel for the two filters, raw water distributing and waste wash water collecting pipes and a filtered water collecting and wash water distributing manifold and lateral system. A contract has been awarded to the Glenwood Tile Company, Philadelphia, for the furnishing and erection of the marble and slate work on a number of the buildings being erected at Camden, N. J., in connection with the company's \$3,000,000 terminal for its seashore lines. The company has also awarded a contract to the Guarantee Construction Company, New York, for the furnishing and erection of coal and ash bunkers with skip hoist equipments for use in connection with the power house under construction at Pier 14, Port Richmond, Philadelphia. This equipment will be installed as part of the new car dumper at Port Richmond.

**SOUTHERN PACIFIC.**—This company jointly with the city of Beaumont, Tex., will construct a viaduct over its tracks at Short and Mariposa streets, Beaumont, Tex.

**SOUTHERN PACIFIC.**—This company is calling for bids for the construction of the third section of the Natron cutoff of the new line between Eugene, Ore., and Klamath Falls. The third section will extend from Kirk, Ore., to a point 42 miles north and will include a 3,300-ft. tunnel. This company has also awarded a contract to John Hampshire, Grants Pass, Ore., for the construction of the second section of the Natron cutoff, 5½ miles long. The announcement of the award of the contract for the first section, 31 miles long, to the same contractor, was made in the *Railway Age* of September 8.



## Railway Financial News

**ALABAMA GREAT SOUTHERN.—Asks Authority to Issue Bonds.**—This company has applied to the Interstate Commerce Commission to nominally issue \$500,000 of first and consolidated mortgage 6 per cent bonds.

**CHICAGO & ALTON.—Asks Authority for Receivers' Certificates.**—The receivers have applied to the Interstate Commerce Commission for authority to issue \$5,400,000 of 6 per cent equipment trust certificates which have been conditionally sold to Freeman & Co., New York, and the F. L. Freeman Company, Cleveland, at 95. The proceeds are to be applied to the purchase and repair of equipment.

*Suit to End Lease.*—See Joliet & Chicago.

**CHICAGO & NORTH WESTERN.—Bonds Offered.**—Kuhn, Loeb & Co. and the National City Company are offering \$15,250,000 first and refunding mortgage 5 per cent gold bonds due May 1, 2037, at 93½ and interest, to yield 5.35 per cent.

**CINCINNATI, INDIANAPOLIS & WESTERN.—Authorized to Issue Bonds.**—This company has been authorized by the Interstate Commerce Commission to issue \$450,000 of first mortgage 5 per cent 50-year gold bonds to be sold, together with \$41,000 of like bonds now held in the treasury, at not less than 75 and accrued interest and the proceeds used for corporate purposes. The company was also authorized to pledge all or any part of the bonds as collateral security for notes.

**IRONTON RAILROAD.—Joint Control Authorized.**—The Interstate Commerce Commission has issued a certificate authorizing the acquisition and control of the Ironton by the Lehigh Valley and the Reading Company jointly by the purchase of its capital stock.

**JOLIET & CHICAGO.—Sues to End Lease.**—Joseph Walker, of Joseph Walker & Sons, members of the New York Stock Exchange, who was elected president of the Joliet & Chicago in the proxy fight for control of this road, which has been under lease to the Chicago & Alton since 1864, has made public a bill of complaint which has been filed in the United States District Court at Chicago protesting the Chicago & Alton's right to continue in charge of the Joliet & Chicago's affairs. The equity suit was begun on November 2 and is the second step in the stockholders' fight on the jurisdiction of the Chicago & Alton over the leased properties of the Joliet & Chicago, Kansas City, St. Louis & Chicago, and the Louisiana & Missouri Pacific, these being the guaranteed stocks of the Chicago & Alton, for which protective committees were formed following the appointment of receivers for the road in September of last year.

The bill of complaint asks that the original lease of January 1, 1864, be canceled and set aside "because of material breaches on the part of the said Chicago & Alton and its receivers in the covenants, terms and conditions thereof, and the property leased thereby restored and returned to the possession of the plaintiff." The complaint also asks for "such other further and different relief in the premises as equity and good conscience deem fit, etc."

**LEHIGH VALLEY.—Final Decree of Segregation.**—Judge Learned Hand, in the United States District Court at New York, on November 8 signed a decree of segregation providing for the disposition by the railroad of its coal properties.

The final decree provides that the Lehigh Valley Railroad shall dispose of all shares of stocks, bonds and other evidences of indebtedness as is necessary to establish entire independence of and from the coal companies.

The Lehigh Valley Railroad, subject to the lien of its general consolidated mortgage, shall so assign stock of the Lehigh Valley Coal Company to a trustee to be appointed by the court, but meanwhile, pending the appointment of a trustee, the coal company may pay the railroad company a cash dividend. The amended plan provides that the rights for subscription by Lehigh Valley Railroad stockholders for certificates of interest be extended until April 15, 1924.

Shareholders who buy certificates in the coal company must dispose of them before December 31, 1927, if they have not in the meantime disposed of the railroad stock. If they have not done so, the certificates will be called and subscription price of \$1 a share refunded. Lehigh Valley Railroad or any corporation controlled by it or any person acting in its interest, shall not acquire any coal stock. The Attorney General is to have access to the stock transfer books. A report on the progress is to be made within six months. Railroad shareholders may subscribe for one share of Lehigh Valley Coal Company stock for every share of railroad stock held.

The amended plan of dissolution as filed February 7, 1923 (See *Railway Age* of February 10, 1923, page 403), and modified by the court in minor details, provides that the Lehigh Valley Coal Company shall execute a new mortgage in authorized amount of \$40,000,000, maturing in 50 years and carrying 5 per cent interest, under which \$15,000,000 bonds shall be sold at once. The proceeds shall be paid to the Lehigh Valley Railroad in satisfaction of all indebtedness to it of the coal company, and are to be devoted by the railroad to improvement of its property pledged under its general consolidated mortgage of 1903. The balance of authorized bonds are to be reserved for refunding and improvements.

As the present \$9,465,000 stock of the Lehigh Valley Coal Company is pledged under the railroad's general consolidated mortgage, the railroad company will sell for \$1,212,160 all of its right, title and interest in equity of redemption which it owns in said stock to a new trustee, which will issue certificates for 1,212,160 shares of interest therein, thus making certificates on basis of one share of interest in Lehigh Valley Coal Company stock for each share of Lehigh Valley Railroad stock, both common and preferred.

Shareholders of the railroad company will be given the right by the new trustee to subscribe to said shares of interest at rate of \$1 a share.

The stock of Cox & Bros. & Company will remain in pledge until maturity on February 1, 1926, of the collateral trust agreement of November, 1905, except that voting power thereof will be assigned to a trustee. In 1926 the stock will be sold by the railroad company.

The stock of the Delaware, Susquehanna & Schuylkill Railroad Company will be similarly trusted until February 1, 1926, but meanwhile the Lehigh Valley Railroad may make application to the Interstate Commerce Commission to consolidate this company with itself.

Provisions against common ownership of railroad stock and shares of interest in coal company stock do not apply to "holdings as broker, pledgee, trustee, agent or otherwise in a representative capacity, provided there is no joint holding by the real parties in interest."

The mining companies, the Lehigh Valley Coal Company and Cox & Bros. & Company will enter into a lawful sales contract with the Lehigh Valley Coal Sales Company, but the modifications of the original decree by the court direct that such contract shall not be similar to the one dated March 1, 1912, annulled by decree on February 24, 1921, and shall not in any manner hinder or restrain the coal sales company from extending its business with entire freedom and independence.

**OLD COLONY.—Bonds Sold.**—R. L. Day & Co. and other bankers have sold at 99 and interest, to yield about 5.58 per cent, \$3,500,000 first mortgage 20-year 5½ per cent bonds dated February 1, 1924, and maturing February 1, 1944. The stockholders have approved this issue, the purpose of which is to refund \$3,000,000 debenture 4 per cent bonds due February 1, 1924.

**PERE MARQUETTE.—Asks Authority to Issue Bonds.**—This company has applied to the Interstate Commerce Commission for authority to issue and sell or pledge \$6,064,000 of first mortgage 5 per cent gold bonds maturing July 1, 1926, the proceeds to be used to reimburse the treasury for expenditures for additions and betterments.

**PITTSBURGH, FORT WAYNE & CHICAGO.—Authorized to Issue Stock.**—This company has been authorized by the Interstate Commerce Commission to issue and deliver to the Pennsylvania Railroad \$21,595,000 of common stock in settlement for expenditures for additions and betterments. The Pennsylvania was authorized to guarantee dividends on the stock.

**SOUTHERN RAILWAY.—Bonds Sold.**—A syndicate headed by J. P. Morgan & Co. and including the First National Bank, National City Company, Harris, Forbes & Co., Guaranty Company of New York and Bankers Trust Company has sold \$20,000,000 Southern Railway development and general mortgage 6 per cent bonds, due April 1, 1956, at 96½ and interest to yield 6.25 per cent.

### Treasury Payments to Railroads

Since last announcement, dated October 1, 1923, payments under Sections 204, 209, 210 and 212 of the Transportation Act, 1920, as amended, have been made by the Treasury as follows:

Section 204:	
Beaver Valley Railroad.....	\$5,649
Cimarron & Northwestern.....	25,228
Flint River & Northeastern.....	4,225
Rome & Northern.....	4,225
Roscoe, Snyder & Pacific.....	17,287
Smoky Mountain Railway.....	3,793
Tavares & Gulf.....	24,266
Washington Run Railroad.....	11,760
Section 209:	
Alton & Southern.....	102,680
Central New England.....	19,204
Charlotte, Monroe & Columbia.....	1,598
Chesterfield & Lancaster.....	4,194
Cleveland, Cincinnati, Chicago & St. Louis.....	2,964,912
Cincinnati Northern.....	25,100
Detroit, Grand Haven & Milwaukee.....	525,434
Detroit & Huron.....	11,890
East & West Coast.....	4,330
Florida Central & Gulf.....	13,015
Franklin & Pittsylvania.....	2,672
Grand Trunk of Canada.....	741,392
Acct. of Atlantic & St. Lawrence, Chicago, Detroit & Canada Grand Trunk Junction; Cincinnati, Saginaw & Mackinaw; Lewiston & Auburn; Michigan Air Line.	
Grand Trunk Western.....	1,171,829

Indiana Harbor Belt.....	897,229
Kanawha & West Virginia.....	56,183
Kanawha & Michigan.....	200,413
Macon, Dublin & Savannah.....	16,337
Michigan Central.....	1,139,828
Natchez, Columbia & Mobile.....	3,723
New Orleans, Texas & Mexico.....	317,019
New York, New Haven & Hartford.....	2,891,206
New York Central.....	5,282,638
Pittsburgh & Shawmut.....	71,739
Pittsburgh & Lake Erie.....	1,275,409
Pontiac, Oxford & Northern.....	63,701
Raleigh & Charleston.....	4,657
Rutland.....	20,646
Tampa & Gulf Coast.....	29,454
Tampa Northern.....	24,819
Toledo & Ohio Central.....	514,687
Toledo, Saginaw & Muskegon.....	105,279
Union Pacific.....	374,294
Acct. of Los Angeles & Salt Lake; Oregon Short Line; Oregon-Washington R. R. & Navigation Co.	
Virginia Blue Ridge.....	780
Waupaca-Green Bay.....	2,941
York Harbor & Beach.....	1,238
Section 210:	
Seaboard Air Line.....	450,000
Section 212:	
Total.....	\$19,428,903

Total payments to October 31, 1923:	
(a) Under Section 204, as amended by Section 212 for reimbursement of deficits during federal control:	
(1) Final payments, including partial pay- ments previously made.....	\$7,608,497
(2) Partial payments to carriers as to which a certificate for final payments has not been received by the Treasury from the Interstate Commerce Commission....	648,030
Total payments account reimbursement of deficits.....	\$8,256,527
(b) Under Section 209, as amended by Section 212 for guaranty in respect to railway oper- ating income for first six months after fed- eral control:	
(1) Final payments, including advances and partial payments previously made.....	\$282,144,859
(2) Advances to carriers as to which a cer- tificate for final payment has not been received by the Treasury from the Inter- state Commerce Commission.....	165,111,223
(3) Partial payments to carriers as to which a certificate for final payment has not been received, as stated above.....	53,123,922
Total payments account of said guaranty.....	500,380,004
(c) Under Section 210 for loans from the revolving fund of \$300,000,000 therein provided.....	339,450,667
Total.....	\$848,087,198
Repayments of loans have been made to the amount of \$146,501,558.	

### Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out and received from the several roads the following amounts:

New Orleans & Northeastern Railroad Co.....	\$1,400,000
New Orleans Terminal Co.....	1,300,000
Kansas City Southern Railway Co.....	1,500,000
Davenport, Rock Island & Northwestern Railway Co.....	75,000
Central Vermont Railway Co. paid Director General.....	700,000
St. John's River Terminal Co. paid Director General.....	18,000
SHORT LINES	
Roscoe, Snyder & Pacific Railway Co.....	25,000

### Dividends Declared

Alabama Great Southern.—Common, 3½ per cent, semi-annually, payable December 27 to holders of record November 28; preferred, 3½ per cent, semi-annually, payable February 15, 1924, to holders of record January 18.  
Boston & Albany.—2½ per cent, quarterly, payable December 31 to holders of record November 30.  
Canadian Pacific.—Common, 2½ per cent, quarterly, payable December 31 to holders of record November 30.  
Central New England.—Common, 2 per cent, payable November 7.  
Cripple Creek Central.—Preferred, 1 per cent, quarterly, payable December 1 to holders of record November 15.  
Germantown & Norristown.—3 per cent, quarterly, payable December 4 to holders of record November 20.  
Midland Valley.—Preferred, 2½ per cent, payable December 1 to holders of record November 24.  
Pittsburgh, Bessemer & Lake Erie.—Preferred, \$1.50, payable December 1 to holders of record November 15.  
Southern Pacific.—1½ per cent, quarterly, payable January 2 to holders of record November 30.  
Union Pacific.—Common, 2½ per cent, quarterly, payable January 2 to holders of record December 1.

### Trend of Railway Stock and Bond Prices

	Nov. 14	Last Week	Last Year
Average price of 20 representative rail- way stocks.....	61.26	60.25	66.27
Average price of 20 representative rail- way bonds.....	82.65	82.38	85.64

## Railway Officers

### Executive

**E. H. Shaw**, whose appointment as vice-president of the Southern with headquarters at Washington, D. C., was announced in the *Railway Age* of October 20, page 749, was born on January 8, 1870, at Philadelphia, Pa. He was educated in a private school and Berkeley Military Academy, New York, and entered railway service in 1889 as a rodman for the Ohio & Northwestern (now Norfolk & Western). In 1890 and 1891 he served as clerk to the general freight and passenger agent of the Cincinnati, Portsmouth & Virginia (now Norfolk & Western) at Cincinnati, Ohio. A year later he was promoted to chief clerk and shortly thereafter to agent at Portsmouth, Ohio. In 1896 he was promoted to general agent and in 1900 he became general freight and passenger agent of the South Carolina & Georgia Extension (now the Southern) at Blacksburg, S. C. Two years later he was appointed division freight agent for the Southern at the same place. In 1903 he became general agent and assistant general freight agent for the Detroit Southern (now D., T. & I.) at Ironton, Ohio. In 1904 and 1905 he was division freight agent for the Southern at Greensboro, N. C. Then until 1907 he was assistant general freight agent at Birmingham, Ala., and subsequently general freight agent at Charleston, S. C. From 1908 to 1917 he was assistant freight traffic manager at Washington, D. C., and from then until 1918, freight traffic manager at Atlanta, Ga. During federal control he was appointed traffic manager on all lines of the Southern Railway and held that position until the time of his recent promotion.

**Fred Zimmerman**, whose election as president of the Cincinnati, Indianapolis & Western, with headquarters at Indianapolis, Ind., was reported in the *Railway Age* of November 10,



F. Zimmerman

was born on July 26, 1866, at Portland, Me. He entered railway service in 1882 as an office boy, after which he was successively promoted to various clerical positions in the freight departments of several roads in Chicago and Detroit. After entering the service of the Michigan Central in the general freight department at Detroit, Mich., in 1897, Mr. Zimmerman was promoted to assistant general freight agent with headquarters at Buffalo, N. Y., on October 1, 1899. He was transferred to Chicago on

July 1 of the following year, where he remained until November 1, 1909, when he was appointed general freight agent of the Indiana Harbor Belt at Chicago. Mr. Zimmerman was appointed general freight agent of the Chicago, Indiana & Southern in addition to his duties on the Indiana Harbor Belt on January 1, 1911, and was appointed general freight agent of the Lake Shore & Michigan Southern with headquarters at Cleveland, Ohio, in March, 1914. In November of that year, he was elected vice-president in charge of traffic of the Chicago, Indianapolis & Louisville with headquarters at Chicago. During the period of federal control, Mr. Zimmerman was traffic assistant for the Chicago terminal district, United States Railroad Administration, and vice-chairman of the traffic division of the American Railway Association. He was reappointed as vice-president of the Chicago, Indianapolis & Louisville after the return of the railroads to private



operation on March 1, 1920, and continued in this capacity until his election as president of the Cincinnati, Indianapolis & Western.

**B. A. Worthington**, whose retirement as president and chairman of the board of directors of the Cincinnati, Indianapolis & Western was reported in the *Railway Age* of November



B. A. Worthington

10, was born on November 20, 1861, at Sacramento, Cal. He entered railway service on July 1, 1874, as a telegraph messenger on the Central Pacific at Sacramento, being subsequently promoted to telegraph operator. In 1877, he became a commercial operator for the Western Union Telegraph Company and held this position until 1882 when he was appointed chief clerk and secretary to the general master mechanic of the Southern Pacific at Sacramento. He was promoted to chief clerk and secretary

to the vice-president and general manager at San Francisco, Cal., in 1888, and in July, 1895, was appointed chief clerk and secretary to the assistant to the president. In 1898, Mr. Worthington was placed in charge of the tonnage rating of locomotives, which position he held until July, 1901, when he was promoted to superintendent of the Tucson division, with headquarters at Tucson, Ariz. He was transferred to the Coast division, with headquarters at San Francisco, in October, 1901, and in August, 1903, was promoted to assistant to the general manager, with the same headquarters. Mr. Worthington was promoted to assistant director of maintenance and operation of the Harriman lines, (the Southern Pacific and the Union Pacific), on April 1, 1904, with headquarters in Chicago. He was appointed vice-president and general manager of the Oregon-Washington Railway & Navigation Company in February, 1905. On June 1 of the same year he was elected first vice-president of the Wheeling & Lake Erie, the Wabash, Pittsburgh terminal and the West Side Belt. He was appointed vice-president and general manager of these lines in September, 1905, and in June, 1908, when the Wheeling & Lake Erie was placed in the hands of receivers, was appointed receiver for the property. On July 1, 1912, Mr. Worthington was elected president and general manager of the Chicago & Alton, which position he held until March 1, 1914. He was elected president and chairman of the board of directors of the Cincinnati, Indianapolis & Western on December 1, 1915.

### A Correction

In the *Railway Age* of October 20, page 724, it was incorrectly announced that George Le Boutillier had been elected president of the Long Island Railroad to succeed the late Ralph Peters. As a matter of fact, the directors of the company have not as yet met to elect a successor to Mr. Peters.

### Operating

**W. Stephenson**, superintendent of the Alexandria & Western, with headquarters at Garden City, La., has been appointed general manager, assuming also the duties of auditor and traffic manager, with the same headquarters. **J. P. Alleman**, general shop foreman, has been promoted to superintendent, with headquarters at Alexandria, La., succeeding Mr. Stephenson.

**J. F. Patterson**, whose promotion to general superintendent of the Eastern Ohio division of the Central region of the Pennsylvania, with headquarters at Pittsburgh, Pa., was reported in the *Railway Age* of October 27, was born on

January 8, 1871, at Alliance, Ohio. Mr. Patterson entered the service of the Pennsylvania at Alliance, on October 1, 1884. He subsequently served in various capacities in the operating department being finally promoted to superintendent of the Erie & Ashtabula division of the Central region with headquarters at New Castle, Pa. Mr. Patterson was serving in this capacity at the time of his recent promotion to general superintendent of the Eastern Ohio division of the Central region with headquarters at Pittsburgh, Pa.

**J. C. McCullough**, whose promotion to assistant to the general manager of the Central region of the Pennsylvania with headquarters at Pittsburgh, Pa., was reported in the *Railway Age* of October 27, was born on August 31, 1865, at Deersville, Ohio. He entered railway service on September 9, 1881, as a shop laborer on the Pittsburgh, Cincinnati, Chicago & St. Louis, now a part of the Pennsylvania, at Dennison, Ohio. Two years later he was promoted to machinist's helper and in 1884 to locomotive fireman. From 1887 to 1898 he served as locomotive engineer and on April 1 of the latter year was promoted to assistant road foreman of engines. On January 1, 1901, he was promoted to road foreman of engines, a year later being promoted to trainmaster. On March 1, 1910, Mr. McCullough was promoted to division superintendent and on April 16, 1919, to general superintendent of the Eastern Ohio division of the Central region with headquarters at Pittsburgh, Pa. He was serving in this capacity at the time of his recent promotion to assistant to the general manager of the Central region.

**Wm. L. Ekin**, whose promotion to general superintendent of the Northern division of the Pennsylvania System with headquarters at Buffalo, N. Y., was reported in the *Railway*



Wm. L. Ekin

*Age* of October 27, was born on September 18, 1879, at Xenia, Ohio. He received his engineering education at the Case School of Applied Science, entering railway service on July 16, 1900, in the maintenance of way department of the Pennsylvania holding various positions until September 1, 1905, when he was promoted to assistant engineer on the Michigan division. On May 1, 1907, he was promoted to division engineer on the same division and was later transferred to the St. Louis division with

headquarters at Terre Haute, Ind., where he remained until February 11, 1918, when he was promoted to superintendent of the Peoria division with headquarters at Decatur, Ill. He was subsequently transferred on July 1, 1918, to the Michigan division, on March 1, 1920, to the Conemaugh division and on March 1, 1923, to the Philadelphia division, with headquarters at Harrisburg, Pa., where he served until his recent promotion to general superintendent.

### Traffic

**G. M. Steele** has been appointed assistant traffic manager of the Okmulgee Northern, with headquarters at Okmulgee, Okla.

**W. J. McMahon** has been appointed general traffic agent for the Missouri & North Arkansas, with headquarters at New Orleans, La.

**J. W. Mitchell**, traffic manager and auditor of the Alexandria & Western, has resigned to accept a similar position with the Groveton, Lufkin & Northern.

**R. G. Hodgkin**, assistant to the general freight agent of the Atlantic Coast Line, with headquarters at Wilmington,

N. C., has been promoted to assistant general freight agent, with the same headquarters. **W. H. Henderson** has been appointed assistant to the general freight agent, with headquarters at Wilmington, succeeding Mr. Hodgkin.

**E. T. Wood**, division freight agent of the Pennsylvania, with headquarters at Fort Wayne, Ind., has been promoted to special agent in the traffic department, with the same headquarters. **G. A. Hill**, district freight representative, with headquarters at Chicago, has been promoted to division freight agent, with headquarters at Fort Wayne, succeeding Mr. Wood.

**H. M. Huff** has been appointed commercial agent of the Louisiana Railway & Navigation Company of Texas, with headquarters at San Francisco, Cal. Mr. Huff's territory will embrace the states of California, Arizona and Nevada in this country and the states of Lower California, Sonora and Sinaloa in Mexico. **John H. Digby** has been appointed commercial agent with headquarters at Seattle, Wash. Mr. Digby's territory will embrace the states of Washington, Oregon, Idaho, Utah, Montana and Wyoming and the provinces of British Columbia, Alberta and Saskatchewan.

### Mechanical

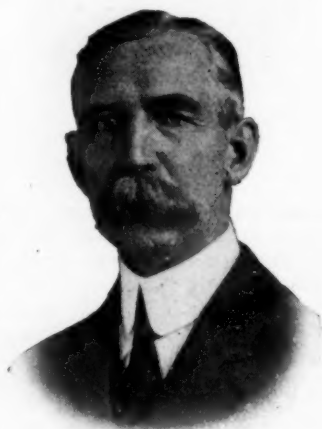
**W. F. Crowder** has been appointed general car inspector of the Pere Marquette, with headquarters at Grand Rapids, Mich., succeeding J. McKenzie, deceased. **E. D. Colon** has been appointed shop efficiency engineer, with headquarters at Detroit, Mich.

### Engineering, Maintenance of Way and Signaling

**N. H. Schafer** has been appointed division engineer of the New York division of the Philadelphia & Reading with headquarters at Philadelphia, Pa.

**J. C. Wrenshall, Jr.**, division engineer on the Philadelphia & Reading with headquarters at Philadelphia, Pa., has been promoted to engineer maintenance of way with headquarters at Reading, Pa., succeeding F. S. Stevens, who has retired from active service.

**F. S. Stevens**, engineer maintenance of way of the Philadelphia & Reading with headquarters at Reading, Pa., has retired. Mr. Stevens was born December 7, 1850, at Athens, Pa., and received his engineering education at Cornell University. He entered railway service on March 13, 1870, holding various positions until 1877, following which he held position as chief engineer, locating engineer, superintendent of construction on a number of small railroads, being appointed in 1882 to engineer maintenance of way of the New York, Ontario & Western. In the following year he was appointed assistant division engineer of the New York, West Shore & Buffalo, being promoted to principal assistant to the chief engineer in 1884. In 1886 he was appointed engineer maintenance of way of the Cortland & Northern and the Canastota & Northern, remaining with these railroads until January 1, 1887, when he was appointed division engineer of the Philadelphia & Reading, serving in this capacity until October, 1900, when he was promoted to superintendent of the Reading & Lebanon divisions with headquarters at Reading, Pa. In October, 1905, he was transferred to the Wilmington & Columbia division, where he remained until October, 1910, when he was pro-



F. S. Stevens

moted to engineer maintenance of way, the position which he held up to the time of his recent retirement.

### Special

**A. N. Page** has been appointed superintendent of the employment bureau of the Northern Pacific with headquarters at St. Paul, Minn., succeeding O. D. Johnson, who has resigned.

### Obituary

**C. W. Kates**, general manager of the Escanaba & Lake Superior with headquarters at Wells, Mich., died on November 12 while on a hunting trip.

**H. R. Carpenter**, assistant chief engineer of the Missouri Pacific, with headquarters at St. Louis, Mo., died suddenly in that city on November 12.

**William Winton**, former district passenger agent of the Chicago, Milwaukee & St. Paul with headquarters at Madison, Wis., died in Milwaukee, Wis., on November 9.

**G. F. Bidwell**, formerly general manager of the lines west of the Missouri river of the Chicago & North Western with headquarters at Omaha, Neb., who retired from active service in 1906, died in Los Angeles, Cal., on November 14.

**G. A. Cellar**, formerly general superintendent of telegraph of the Pennsylvania System, died on November 13 in the Hahnemann Hospital, Philadelphia, after an illness of about three weeks. Mr. Cellar retired from active service under pension regulations on May 1, of the present year, having been continuously in the service of the Pennsylvania Railroad System for more than 46 years. Mr. Cellar was born September 12, 1860, in Delaware county, Ohio. He entered the service of the Western division of the Pennsylvania System, as a telegraph operator in 1877. After serving several years as operator he became manager, and afterwards chief clerk at Crestline, Ohio. On February 22, 1904, Mr. Cellar was promoted to superintendent of telegraph of the Pennsylvania, Lines West. Upon the reorganization of the system, following the termination of federal control, Mr. Cellar became general superintendent of telegraph of the Pennsylvania System, with headquarters at Philadelphia, and continued in that position until his retirement.

**B. J. Dalton**, who was chairman of the valuation committee of the Missouri-Kansas-Texas from March 1, 1916, to July 31, 1920, died at the M-K-T. Hospital, Parsons, Kansas, on October 28. Mr. Dalton was born at Franklin, Ky., on May 20, 1865, and was graduated from the University of Kansas in 1890, having completed a course in civil engineering. His first railway experience was as a rodman on construction for the Missouri Pacific in 1887. After leaving college he became a transitman on construction for the Union Pacific and in 1891 entered the service of the Texas, Louisiana & Eastern (now G. C. & S. F.) as resident engineer. In 1893-94 he was engaged in a preliminary survey for 100 miles of projected line in Colorado; then for a brief period he was engaged in private practice. From 1895 to 1898 he was division engineer of construction for the Kansas City, Pittsburg & Gulf (now Kansas City Southern). He was appointed chief engineer of the Kansas, Oklahoma Central & South Western in 1898, and in 1900 became assistant chief engineer of the St. Louis & North Arkansas and the Arkansas & Choctaw (St. L.-S. F.). From 1903 to 1905 he was city engineer at Lawrence, Kansas, and then for a year was chief engineer of the Denver, Enid & Gulf (now A., T. & S. F.). In 1906 he was appointed associate professor of civil engineering and professor of railway engineering at the University of Kansas and held that position until 1914. During this period he served also, with the Kansas Public Utilities Commission. In 1914 he was appointed assistant division engineer, division of valuation, Western district, Interstate Commerce Commission, with headquarters at Kansas City, Mo., and held that position until his appointment as chairman of the valuation committee of the Missouri-Kansas-Texas in 1916. On August 1, 1920, Mr. Dalton was assigned to lighter duties on account of his failing health.